ADDENDUM TO THE DRAFT ECONOMIC ANALYSIS OF PROPOSED CRITICAL HABITAT DESIGNATION FOR THE KAUA'I CAVE WOLF SPIDER AND THE KAUA'I CAVE AMPHIPOD[1]

1. INTRODUCTION

In March 2002, the U.S. Fish and Wildlife Service (the Service) proposed designation of critical habitat under the Endangered Species Act of 1973, as amended (the Act), for the endangered Kaua'i cave wolf spider (*Adelocosa anops*) and Kaua'i cave amphipod (*Spelaeorchestia koloana*) (the cave animals). This proposal encompassed approximately 4,193 acres of land on the island of Kaua'i in the State of Hawai'i. Because the Act requires an economic analysis of the critical habitat designation, the Service released a "Draft Economic Analysis of Proposed Critical Habitat Designations for the Kaua'i Cave Wolf Spider and the Kaua'i Cave Amphipod, Island of Kaua'i, Hawai'i" (hereafter the DEA) for public review and comment in November 2002.[2]

The primary purpose of this Addendum is to update the DEA. As such, the Addendum revisits the assumptions and analytic conclusions presented in the DEA in light of new information obtained since the DEA was published. It also addresses issues raised in public comments on the DEA. The DEA as revised and updated by this Addendum constitutes the final economic analysis on this proposal to designate critical habitat.

2. EXCLUDED AND REDUCED UNITS

As a result of new information and for biological reasons, not economic impacts, the Service indicates that it intends to redraw the boundaries to reduce the acreage in Units 1a and 2, and remove Units 1b and 3 in the final critical habitat designation for the cave animals. These intended changes will reduce the total critical habitat acreage from approximately 4,193 acres to 272 acres (i.e., a reduction of 3,921 acres or 94 percent). The Service further indicates that it intends to split the remaining acreage (in Units 1a and 2) into 14 smaller units that will protect caves, mesocaverns, and areas containing higher quality habitat for the cave animals. Figure Add-1 presents the extent of the originally proposed designation and the intended (revised) designation. Tables Add-1 and Add-2

[1] A draft of this report was prepared by Industrial Economics, Incorporated (IEc), under contract to the Service's Division of Economics, with technical assistance from Decision Analysts, Hawai'i and Research Solutions, LLC. This final report may, however, incorporate changes made to that draft by the U.S. Department of the Interior.

[2] Copies of the DEA are available from the Pacific Islands Fish and Wildlife Office, U.S. Fish and Wildlife Service, Honolulu, Hawai'i.

show the acreage, land ownership, and land-use districts for the 14 intended units. A description of each of the 14 intended units, as well as the reasons for the reduction in acreage, will be included in the final rule. A brief description of each of the intended final units, including the current or planned land uses and/or land management, follows:

— **Unit 1**: This 1.1-acre unit incorporates a newly found cave and associated mesocaverns. The Service has verified the presence of the Kaua'i cave wolf spider in this unit and believes that the Kaua'i cave amphipod is likely to be found when conditions are appropriate. Development in intended Unit 1, along with intended Units 2 and 3 (described below), is within the Alexander & Baldwin, Inc. (A&B) Kukui'ula development project site. A&B has indicated that it will record a conservation easement that will permanently preclude future development within these units. A&B has also indicated it will develop a cooperative agreement jointly with the Service under which these areas will be protected, managed, and enhanced in perpetuity (A&B, 2002). Development within intended Unit 1 would have been precluded even absent implementation of section 7 for the cave animals because the unit contains significant archaeological resources.

— **Unit 2:** This 16.3-acre unit incorporates four caves and surrounding mesocaverns; two of the caves have verified occurrences of the cave animals. Portions of this unit are already being managed for the cave animals under a 1995 cooperative agreement between Kukui'ula Development Corporation (a subsidiary of A&B) and the Service. The remaining area was planned for a school. However, as discussed above, A&B plans to record a conservation easement and a cooperative agreement for the entire intended unit to benefit the cave animals. Absent the implementation of section 7 for the cave animals, it is likely that this intended unit would have been developed as part of the Kukui'ula development.

— **Unit 3**: This 15.9-acre unit consists of a cave and surrounding mesocaverns with suitable habitat for both of the cave animals. As discussed above, A&B plans to record a conservation easement and a cooperative agreement for the entire unit for the benefit of the cave animals. Just as in intended Unit 1, development within this intended unit would have been precluded even absent implementation of section 7 for the cave animals because it contains significant archaeological resources.

— **Unit 4:** This 5.9-acre unit consists of a cave and the surrounding mesocaverns with verified occurrences of the cave animals. The unit is not being managed for conservation of the cave animals, and single-family homes and a portion of a golf course are planned.

— **Unit 5:** This 2.1-acre unit consists of a cave and the surrounding mesocaverns with verified occurrences of the cave animals. The cave is located under the existing Kiahuna Golf Course, and is being managed to protect the cave animals. Specifically, the entrance to the cave has been gated; informational signs have been posted; and the area above the cave has been planted with native vegetation recommended by the Service that is likely to provide food for the Kaua'i cave amphipod. A change in management is not anticipated within the 18-year timeframe of this analysis.

— **Unit 6:** This 3.7-acre unit consists of a cave identified in an archaeological survey and is likely to provide the most suitable habitat for the cave animals in this area. Its occupancy status is unknown. The site is not being managed to protect the cave animals and is in an area planned for medium-density, single-family resort/residential development.

— **Unit 7**: This 8.6-acre unit consists of the most likely suitable habitat remaining in an area where a cave with a verified occurrence of the amphipod is located. While the cave was located and the presence of the cave animals was verified in 1976, the exact location of the cave, and the presence or absence of the cave animals within it, is unknown today. The Service has designated the area most likely to be undisturbed by previous surface disturbance, thereby providing the best cave and mesocavern habitat for the Kaua'i cave amphipod. The land is currently owned by the Roman Catholic Church, which has no plans to develop within the unit.

— **Unit 8:** This 6.7-acre unit contains a lava tube identified through an archaeological survey and the surrounding mesocaverns associated with the tube. The Service indicates that this area is more likely to harbor the cave animals compared to adjacent areas and contains the *primary constituent elements* for the cave animals. The site is not being managed to protect the cave animals, and is in an area planned for a medium-density, single-family resort/residential development on private land and medium-density, single-family homes on State land.

— **Unit 9:** This 3.7-acre unit consists of a cave with the verified occurrence of the cave amphipod and surrounding available mesocaverns. The intended unit comprises the open field of a county park and is being managed to protect the cave animals. Specifically, the entrance to the cave has been sealed and the area above the cave has been planted with vegetation to provide food for the Kaua'i cave amphipod. This analysis assumes that no change in management will be needed to protect the cave animals within the 18-year timeframe of the analysis.

— **Unit 10:** This 35.3-acre unit contains what is believed to be a cave once used as a Civil Defense shelter. Although the Service does not know the exact location of the cave, Service biologists estimated its location from the Civil Defense map for the area. This intended unit is likely to contain the longest and largest cave in the area. It is unclear whether the cave animals *occupy* the cave. Most of the intended unit is currently used for grazing, but the landowner—Grove Farm Company, Inc. (Grove Farm)—plans a commercial development in the southeastern corner. In addition, a small landowner owns about 2.1 acres in this intended unit and plans to construct a home on the property.

— **Unit 11:** This 9.7-acre unit includes the cinder cone Pu‘u Wanawana and has been identified as the area most likely to contain *occupied* caves compared to the surrounding areas. The area within intended Unit 11 contains barren exposed rock, minimal prior surface disturbance, and minimal soil deposits—features that provide for higher quality caves and mesocaverns. The landowner, Grove Farm, plans to build a golf course around the cinder cone, but does not plan to disturb the cinder cone itself.

— **Unit 12:** This 15.9-acre unit includes the cinder cone Pu‘u Hunihuni. It is characterized by barren exposed rock, minimal prior surface disturbance, and minimal soil deposits—features that provide for higher quality caves and mesocaverns. An old cinder pit is located within the cinder cone, but the disturbed area has been excluded from the intended unit. The landowner, Grove Farm, plans to build a golf course and a low-density housing development around the cinder cone, but does not plan to disturb the cinder cone itself.

— **Unit 13:** This 51.7-acre unit stretches along the Maha‘ulepu coastline and consists of the only known *occupied* limestone cave and adjacent limestone areas having suitable habitat. Most of the intended unit is within the State Conservation District and all of it is in the county Special Management Area (SMA). These land-use designations largely preclude development in these areas (Chapter IV of the DEA describes these land-use regulations in greater detail). As a result, none of this intended unit is currently planned for development. Although some of the land is in the Agricultural District, it is comprised of a sink hole which is unsuitable for economic uses.

— **Unit 14:** This 96.1-acre unit is composed of uplifted coral and algal reefs and consolidated calcareous deposits. It is not known if this intended unit is *occupied* by the cave animals. Most of this intended shoreline unit is in the Conservation District and the SMA and, as a result, development is largely precluded within the intended unit. The remaining 22.4 acres in the intended

> unit are in the Agricultural District. This acreage is not being used for grazing and does not have development potential due to steep slopes and unstable soils.

The Service indicates that, as a result of these changes, the final critical habitat designation will likely be 272 acres (memorandum to the Service, Washington Office, from the Service, Honolulu Field Office, January 15, 2003). The preamble to the final rule explains the Service's revisions to the proposed critical habitat designation. Henceforth, the terms "intended designation", "intended unit", and "intended critical habitat" refer to the designation with the above intended modifications. The terms "proposed designation" and "proposed critical habitat" refer to the designation as contained in the proposed rule.

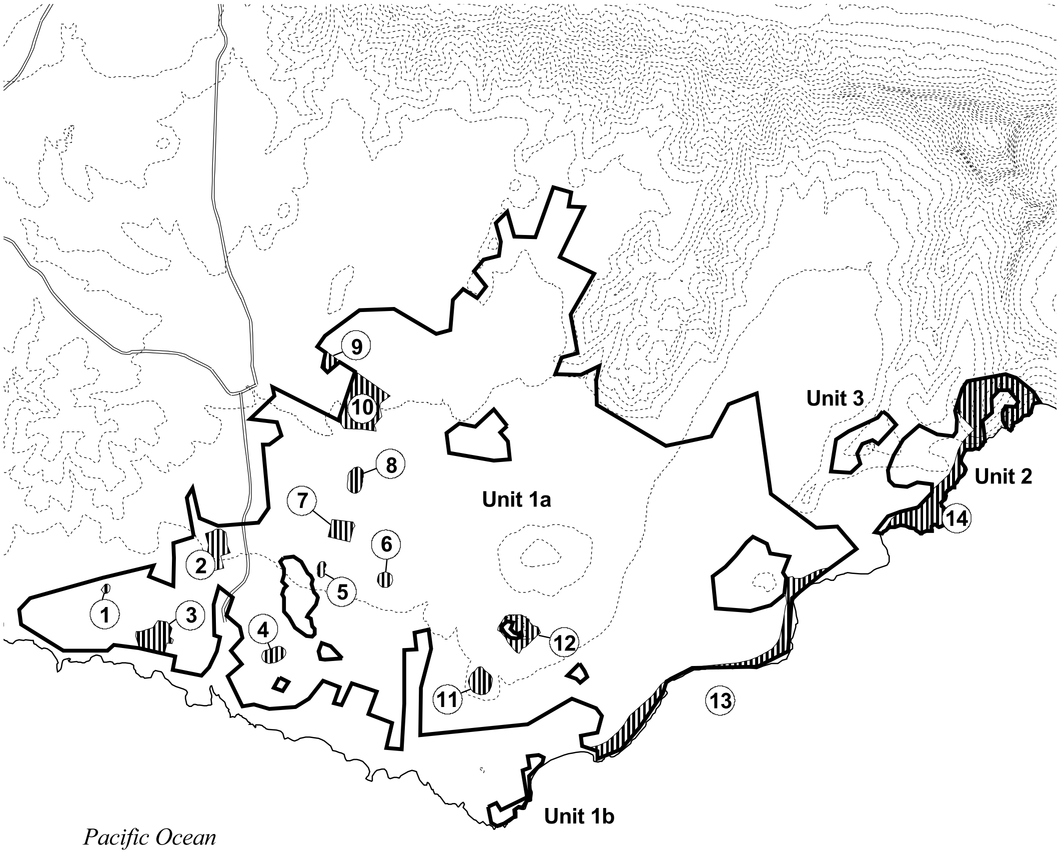

Figure Add-1
Proposed and Intended Critical Habitat Designation

Intended Critical Habitat Unit

Proposed Critical Habitat Unit

Major Roads

Coastline

Elevation (100-ft. contours)

0.5 0 0.5 1 Kilometers

0.5 0 0.5 1 Miles

Table Add-1: Cave Animals Proposed and Intended Critical Habitat: Acreage Differences, by Unit

Proposed Rule Units	Proposed Rule Acres	Addendum Units	Addendum Acres*	Change
Unit 1a/1c	3,974.5	Unit 1	1.1	(3,797.9)
		Unit 2	16.3	
		Unit 3	15.9	
		Unit 4	5.9	
		Unit 5	2.1	
		Unit 6	3.7	
		Unit 7	8.6	
		Unit 8	6.7	
		Unit 9	3.7	
		Unit 10	35.3	
		Unit 11	9.7	
		Unit 12	15.9	
		Unit 13	51.7	
Unit 1b	16.6	n/a	-	(16.6)
Unit 2	167.9	Unit 14	96.1	(71.8)
Unit 3	33.9	n/a	-	(33.9)
All Units	**4,193**	**All Units**	**272**	**(3,921)**

* Unit acreage may not equal total acres due to digital mapping discrepancies bewteen TMK data and USGS coastline, or due to rounding.

Table Add-2: Cave Animals Proposed and Intended Critical Habitat: Acreage Differences, by Land Ownership and State Districting

Item	Proposed Rule Acres	Addendum Acres	Change
Land Ownership*			
Federal	-	-	-
State	70	1	(69)
County	10	3	(7)
Church	64	9	(55)
Private, Major Owner	3,598	249	(3,349)
Private, Minor Owners	407	11	(397)
County and Private Roads	44	-	(44)
State Land Use Districts*			
Conservation	136	120	(16)
Agricultural	3,096	108	(2,988)
Urban and Rural	963	45	(918)

* Land ownership and State land use district acreage totals may not be equal due to digital mapping discrepancies bewteen TMK data and USGS coastline, or due to rounding.

3. DIRECT SECTION 7 COSTS

As noted above, the Service indicates that it intends to remove 3,921 acres (94 percent) from the proposed designation for biological reasons. Most of the activities described in the Direct Costs section of the DEA no longer occur in the intended designation. This will reduce to zero almost all of the direct costs estimated in the DEA. A brief description is given below of how the direct costs change or why they are no longer applicable for each category of direct costs. The DEA costs, the revised Addendum costs, and an explanation of the changes are presented in Table Add-3 at the end of this Addendum.

3.a. Conservation Programs

This analysis assumes that landowners within the intended designation may seek Federal funding for cave animal conservation programs. Based on past cave animal conservation projects, Federal funding is likely to come from the Service and the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS).

3.a.(1) Service Conservation Programs

Chapter VI, Section 3.a. of the DEA presented estimates of the costs associated with an internal informal section 7 consultation regarding a potential Partners for Fish and Wildlife (PFW) conservation agreement between Grove Farm and the Service. New information provided during the public comment period indicates that A&B will also enter into a second conservation agreement with the Service. In addition, the demarcation of specific caves and associated mesocaverns that are essential to the conservation of the cave animals may increase the number of landowners entering into conservation agreements. Specifically, this analysis estimates that three more landowners whose lands contain critical habitat units that are not currently managed for the benefit of the cave animals may seek to enter into conservation agreements with the Service. Thus, this analysis estimates the total number of PFW conservation agreements over the next 18 years will be between two and five agreements.

Potential Project or Activity, next 18 years: PFW conservation agreements

Federal Involvement: Partial funding from the Service

Consultations and Costs

Possible informal internal Service consultation. The private landowners are not likely to be involved in the consultation.

- Total Section 7 Costs: $23,500 to $34,900

Estimate is based on (1) two to five PFW conservation agreements in the next 18 years, (2) and Low cost from Table VI-1 in the DEA of a consultation with a Federal agency as the Applicant. Most of the caves and intended critical habitat units have already been surveyed so, in most cases, additional surveys are not likely to be necessary. However, some of the critical habitat on the Grove Farm land has been surveyed only cursorily so additional cave locations may be found within the intended critical habitat. This analysis assumes that Grove Farm and the Service will share the cost of a biological survey of the intended critical habitat units on this land. This survey will cost $15,900, based on the cost provided in Table VI-2 of the DEA of a survey of a large open area with easy access.

Anticipated Project Modifications and Costs: None

Since the consultation will be conducted on restoration projects designed by the Service, the likely outcome of the consultation is that the project will promote conservation of the species, and will not adversely affect the cave animals or other listed species. Therefore no project modifications are anticipated.

Potential Entities Impacted:

Federal: Service
Private: Grove Farm

3.a.(2) NRCS Conservation Programs

Chapter VI, Section 3.b.(2) of the DEA presented estimates of the costs associated with eight to 14 consultations regarding a potential USDA conservation programs. As discussed in Section 3.a.(1) above, the designation of critical habitat units around specific caves and mesocaverns that are essential to the conservation of the cave animals may prompt landowners to seek Federal funding for conservation programs. In fact, the criteria used by the NRCS in determining which Wildlife Habitat Incentives Program (WHIP) projects to fund states that a preference should be given to projects in critical habitat. The two landowners that have already entered into PFW cave conservation agreements have also received funding from NRCS under the WHIP program to plant native vegetation above the cave footprints. As a result, this analysis assumes that the two to five landowners who may enter into the PFW conservation agreements mentioned above will also obtain NRCS funding through the WHIP program.

Potential Project or Activity, next 18 years: NRCS conservation projects

Federal Involvement: Partial USDA funding

Consultations and Costs

The ranchers and landowners would be notified about the consultations but generally would not be involved in the consultation process for conservation projects (NRCS, 2002).

- Total Section 7 Costs: $7,600 to $19,000

Estimate is based on (1) two to five conservation projects over the next 18 years, (2) Low cost from Table VI-1 in the DEA of a consultation with a Federal agency as the Applicant, and (3) no biological surveys because most of the critical habitat units have been surveyed. The cost associated with surveying the remaining units on Grove Farm's land is included above.

Anticipated Project Modifications and Costs: None

In general, NRCS conservation projects are designed to reduce soil erosion, conserve water, and enhance wildlife habitat. These projects benefit the cave animals since they can reduce sedimentation in caves and promote the use of native vegetation above caves, so this analysis anticipates no project modifications.

Potential Entities Impacted:

Federal: Service, NRCS

3.b. Farming and Ranching Operations

Chapter VI, Section 3.b.(1) of the DEA provided estimates of the direct section 7 costs associated with the USDA Farm Services Agency (FSA) farm loan programs. None of the intended units is being farmed, although less than 45 acres in intended Units 6, 8 and 10 are used for low-intensity cattle grazing. Based on this and the information on FSA farm loan programs presented in Chapter VI, Section 3.b.(1) of the DEA, this analysis assumes that the probability is low that the ranchers who graze cattle in these units will obtain an FSA farm loan. As a result, this analysis estimates the direct section 7 costs associated with farm loan programs to be zero.

3.c. Mining and Quarrying Operations

Chapter VI, Section 3.c. of the DEA discussed the direct section 7 costs associated with the expansion of mining activities to a new quarry site. This site is no longer in the intended designation, so this analysis estimates direct section 7 costs to be zero.

<u>3.d. Navigational Aids</u>

Chapter VI, Section 3.d. of the DEA discussed the direct section 7 costs associated with the operation and maintenance (O&M) of an existing navigational aid. This navigational aid is no longer in the intended designation, so this analysis estimates direct section 7 costs to be zero.

<u>3.e. Places of Worship and Cemeteries</u>

Chapter VI, Section 3.e. of the DEA discussed the direct section 7 costs associated with the O&M of existing church buildings and a cemetery along with the construction and of a building on an existing foundation. The church buildings, cemetery, and existing foundation are no longer in the intended designation, so this analysis estimates direct section 7 costs to be zero.

<u>3.f. Power Lines</u>

Chapter VI, Section 3.f. of the DEA discussed the direct section 7 costs associated with the O&M, replacement, extension and undergrounding of existing and planned power lines. It is not known if future power lines will be placed in critical habitat. However, as explained in the DEA, there is no *Federal involvement* for the activities associated with power lines. Thus, this analysis estimates the direct section 7 costs to be zero.

<u>3.g. Water Systems</u>

Chapter VI, Section 3.g. of the DEA discussed the direct section 7 costs associated with the O&M of existing irrigation and potable water systems and construction of new irrigation and potable water systems. Existing irrigation and potable water systems are no longer in the intended critical habitat. But if urban development were to occur in one or more intended units, one or more water mains could be constructed in the intended critical habitat to service these developments. However, there would be no *Federal involvement* that would prompt a section 7 consultation.

<u>3.h. Roads</u>

Chapter VI, Section 3.h. of the DEA discussed the direct section 7 costs associated with the O&M of existing roads and the construction of new roads. One unimproved road passes through intended Unit 2. However, as explained in the DEA, because there is no *Federal involvement* for the O&M of existing unimproved roads, this analysis estimates the direct section 7 costs to be zero.

One new road construction project may affect the intended critical habitat in the next 18 years. This project by the Kaua‘i County Department of Public Works (DPW) involves widening the Koloa Bypass Road that passes through approximately 0.3 mile of intended Unit 10.

Potential Project or Activity, next 18 years: Koloa Bypass Road widening.

Federal Involvement: U.S. Federal Highways Administration (FHWA) funding

Major public road construction and improvement projects on Kaua‘i are generally 80-percent funded by the FHWA.

Consultation and Costs:

- Total Section 7 Costs: $19,400

Estimate based on the following: (1) one consultation on the Koloa Bypass Widening; (2) Medium cost (from Table VI-1 of the DEA) of a consultation with a non-Federal Agency as the Applicant; and (3) one biological survey of a small-sized open construction corridor with easy access (from Table VI-2 of the DEA).

Anticipated Project Modification and Costs:

- Total Section 7 Costs: $170,000 to $285,000

The DEA provides a detailed description of the project modification costs associated with roads. The same methodology is used to calculate the total project modification costs associated with the widening of the Koloa Bypass Road. However, within the intended critical habitat designation, the widening project affects only 0.3 mile (as opposed to 2.5 miles in the proposed designation). As a result, this analysis estimates a reduction in the project modification costs for the Koloa Bypass Road from a range of $1.4 million to $2.4 million to a range of $170,000 to $285,000.

Potential Entities Impacted:

Federal: Service, FHWA
County: DPW

3.i. Development

Chapter VI, Section 3.i. of the DEA discussed the direct section 7 costs associated with resort/residential development (i.e., second homes and homes for retirees from outside Kaua‘i); related golf courses; and residential development (i.e., homes for working residents). Each of these types of development is discussed separately below.

3.i.(1) Resort/Residential Development

All or portions of intended Units 2, 4, 6 and 8 are currently planned for three resort/residential developments. These developments include:

— **Kukui‘ula Development:** Intended Units 1, 2, and 3 are all included within the boundaries of the planned Kukui‘ula development. However, Units 1 and 3 are not planned to be developed because they contain significant archeological resources. Approximately 8.3 acres of Unit 2 are currently managed for the benefit of the cave animals as part of a Cooperative Agreement between the Kukui‘ula Development Company (a subsidiary of A&B) and the Service. The remaining 8.0 acres are planned for development. The entire Kukui‘ula development will cover roughly 1,045 acres and is currently planned to contain 1,500 medium-density resort/residential units, a golf course, resort facilities, a commercial area, parks, a community recreation area, and a school site (A&B, 2002).

— **Kiahuna Master Plan:** Intended Unit 4 is included within the Kiahuna Master Plan development site. Portions of this master planned area (the Kiahuna Golf Village and the Kiahuna Golf Course) are already built. Intended Unit 4 is south of the existing Kiahuna Golf Course and contains 1.1 acres planned for resort-residential housing and 4.8 acres planned for a portion of a 9-hole golf course. The entire Kiahuna Master Plan contains roughly 95 acres planned for single-family and multi-family resort/residential homes, and roughly 75 acres planned for the 9-hole golf course (Makai Properties, 2002). The current owner of the undeveloped land in the Kiahuna Master Plan is KG Kaua‘i Development, LLC.

— **Po‘ipulani:** Intended Units 6 and 8 are included within the Po‘ipulani development. These units contain lava tubes, archeological sites, and buffer zones that are not planned for development. The units also contain all or portions of lots that are planned for development. The entire Po‘ipulani development is roughly 190 acres and is planned to contain roughly 400 single-family and multi-family resort/residential units (PBR Hawai‘i, 2002). The current owner of the Po‘ipulani development is E.A. Knudsen Trust.

As stated in the DEA, the Kukui‘ula development in intended Unit 2 is adjacent to the Waikomo Stream, and project representatives have already applied for an Army Corps of Engineers (ACOE) section 404 permit. A final permit was granted in 1997. Since ACOE has no additional discretionary approvals over the project, the agency does not expect to enter into a consultation with the Service on this project (ACOE, 2002).

The resort/residential development in the Kiahuna Master Plan and the Po‘ipulani projects are not likely to have *Federal involvement*. Specifically, the most likely Federal permit requirement would be a shoreline alteration permit or a section 404 permit, both administered by the ACOE. Because the projects are not located on or adjacent to the coast or a stream or drainage, the project representatives will not be required to obtain either of these permits. In addition, research performed in support of this analysis did not identify additional Federal funding or permit requirements associated with these projects.

The Maha'ulepu hotel and resort/residential project described in the DEA that may have *Federal involvement* is not in the intended designation. As a result, this analysis estimates direct section 7 costs to be zero.

3.i.(2) Existing Golf Courses and Parks

Portions of intended Units 5 and 13 are located within or adjacent to existing golf courses. However, as explained in the DEA, because there is no *Federal involvement* for O&M of golf courses, this analysis estimates the direct section 7 costs to be zero.

3.i.(3) Planned Golf Courses and Parks

A portion of intended Unit 4 is located within a site planned for the expansion of the existing Kiahuna Golf Course. This project may impact the Waikomo Stream, in which case it would require a section 404 permit from the ACOE.

<u>Potential Project or Activity, next 18 years</u>: Expansion of the Kiahuna Golf Course

<u>*Federal Involvement*</u>: Section 404 ACOE permit

<u>Consultation and Costs</u>:

- Total Section 7 Costs: $15,700

Estimate is based on (1) one consultation for the expansion of the Kiahuna Golf Course, (2) Medium cost (from Table VI-1 of the DEA) of a consultation with a non-Federal Agency as the Applicant, and (3) no biological survey because the unit has already been surveyed by the Service.

<u>Anticipated Project Modification and Costs</u>:

- Total Section 7 Costs: $24,200 to $54,600

As mentioned in the DEA, the cave that is known to be *occupied* by the cave animals in intended Unit 5 is located under, or adjacent to, an existing golf course. Thus, the operation of the golf course to date does not appear to have harmed the cave animals. However, the expansion of the golf course will involve grading and landscaping, activities that the Service indicates may affect the habitat of the cave animals. In order to minimize the impacts of these activities, the Service indicates that it may suggest to the golf course developers that they gate and preserve the cave and use native vegetation for the areas around the greens and fairways above the mesocaverns in intended Unit 4.

As indicated in Section 2.b.(4) of Chapter VI of the DEA, the average cost to install tamper-resistant steel grates, seal a cave, and revegetate the area above the cave ranges from $5,000 to $15,000 per cave. The average cost to import native plants ranges from $3,200 to $6,600 per acre. Since there is one cave and 6 acres in intended Unit 4, this analysis estimates the total project modification costs will range from $24,200 to $54,600 ($5,000 per cave + (6 acres x $3,200 per acre); $15,000 per cave + (6 acres x $6,600 per acre)).

<u>Potential Entities Impacted:</u>

Federal: Service, ACOE
Private: KG Kaua'i Development, LLC

3.i.(4) Existing Residential Units

As explained in the DEA, certain rehabilitation activities to existing homes qualify for Federal and Federally-funded loan programs. There is only one existing residential unit in the intended critical habitat (a portion of intended Unit 13), and the owner has no plans for rehabilitation activities or any other *Federal involvement* (Gillin Beach House, 2003). Thus, this analysis estimates the direct section 7 costs associated with existing residential units to be zero.

3.i.(5) Residential Development

Approximately one acre of the area planned for the Weliweli expansion residential development is included in intended Unit 8. However, since the entire project site is 75 acres and it is in the preliminary stages of planning, this analysis assumes that the project planners will be able to design the development so as to avoid impacts to the intended critical habitat. Thus, this analysis estimates the direct section 7 costs to be zero.

<u>3.j. Commercial Development</u>

Chapter VI, Section 3.j. of the DEA discussed the direct section 7 costs associated with commercial development. Two commercial projects mentioned in the DEA are no longer in the intended critical habitat. However, intended Unit 10 contains a portion of a site planned by Grove Farm for commercial development at the intersection of the Koloa Bypass Road and Weliweli Road. This site is currently in the Agricultural District and is not included in the 2000 *Kaua'i General Plan*. Assuming that Grove Farm is able to obtain the necessary approvals and proceeds with the project, the commercial development would not likely have any *Federal involvement*. Accordingly, this analysis estimates the direct section 7 costs to be zero.

<u>3.k. Industrial Development</u>

Chapter VI, Section 3.k. of the DEA discussed the direct section 7 costs associated with industrial development. The site planned for industrial expansion that was mentioned in the DEA is no longer in the intended designation, so this analysis estimates the direct section 7 costs to be zero.

3.l. Wastewater Treatment

Chapter VI, Section 3.l. of the DEA discussed the direct section 7 costs associated with the construction of individual wastewater systems (IWSs) and wastewater treatment plants (WWTPs).

The construction of IWSs does not have *Federal involvement* because permitting is carried out by the State Department of Health. Thus, this analysis estimates direct section 7 costs to be zero.

As mentioned in the DEA, the county is considering constructing two WWTPs to service Koloa and Po‘ipu by the year 2020. The sites for these WWTPs have not been determined. The DEA assumed that one or both of the sites could be located in critical habitat. Since the Service intends to reduce critical habitat by approximately 94 percent from the proposed critical habitat acreage, the probability that the WWTP will be located in the intended critical habitat is very low. In addition, many of the intended critical habitat units will not be structurally suitable for the construction of a WWTP due to the existence of large lava tubes. As a result, this analysis anticipates that the WWTPs will be constructed outside the intended designation, and estimates the direct section 7 costs to be zero.

3.m. Injection Wells

Chapter VI, Section 3.m. of the DEA discussed the direct section 7 costs associated with using existing injection wells and drilling new injection wells. The two existing injection wells mentioned in the DEA are not in the intended critical habitat. The DEA estimated that ten new injection wells may be built in association with future development projects. Only small portions of a few planned developments remain in the intended designation. This analysis anticipates that the project managers will likely be able to avoid placing the injection wells in the intended critical habitat at little or no extra cost, and therefore estimates the direct section 7 costs to be zero.

3.n. Underground Storage Tanks

Chapter VI, Section 3.n. of the DEA discussed the direct section 7 costs associated with constructing underground storage tanks (USTs). A gas station and associated USTs mentioned in the DEA may be located in the planned commercial development in intended Unit 10. However, as mentioned in the DEA, because there is no *Federal involvement* for constructing USTs, this analysis estimates the direct section 7 costs to be zero.

3.o. Ecotourism

Chapter VI, Section 3.o. of the DEA discussed the direct section 7 costs associated with commercial hiking tours. Hiking tours are conducted along the Maha‘ulepu coastline in intended

Units 13 and 14. However, as explained in the DEA, there is no *Federal involvement* for commercial hiking tours or other ecotourism activities. As such, this analysis estimates the direct section 7 costs to be zero.

<u>3.p.</u> <u>Natural Disaster</u>

Chapter VI, Section 3.p. of the DEA discussed the direct section 7 costs associated with Federal programs that offer assistance in the event that a natural disaster (such as a major hurricane or a *tsunami)* damages farmland or the infrastructure of a community. In view of the reduced size of the intended critical habitat, the limited economic activity within the intended units (only grazing in intended Units 6, 8 and 10), and the limited development that is anticipated in the intended designation, this analysis estimates direct section 7 costs to be negligible.

<u>3.q.</u> <u>Service Incidental *Take* Permits</u>

Chapter VI, Section 3.q. of the DEA discussed the direct section 7 costs associated with the issuance of incidental *take* permits by the Service. Specifically, the costs estimated were those associated with internal Service section 7 consultations on issuance of these permits. The number of incidental *take* permits and associated habitat conservation plans (HCPs) were estimated in the DEA based on the number of road projects and development projects that would not involve a section 7 consultation.

As described in the indirect section, below, this analysis concludes that landowners in the intended designation will likely opt to address the uncertainty associated with the implementation of the intended designation in ways other than obtaining an HCP. As such, no section 7 consultations for HCPs developed *specifically to address uncertainties associated with the intended critical habitat designation* are anticipated. Thus, this analysis estimates the direct section 7 costs of HCPs and incidental *take* permits to be zero.

4. INDIRECT COSTS

As noted in the DEA, because consultation under section 7 only applies to activities that have *Federal involvement*, the designation of critical habitat alone does not afford any additional protections for listed species with respect to strictly private activities. However, the DEA also recognized that designation of critical habitat may have indirect impacts beyond those associated with the Act based on the interplay of critical habitat designation with State and local laws. For example, potential indirect impacts raised by stakeholders include imposition of conservation management obligations, redistricting of Agricultural land into the Conservation District, and reduced property values.

The economic cost associated with an actual or perceived loss of development potential is expressed in terms of a loss in property value. These values reflect: landowner's development plans (if any); existing entitlements; the probability of obtaining remaining development approvals (State districting, General Plan designation by the county, county zoning, etc.); and existing infrastructure improvements. In some cases, the loss in property value is estimated directly based on adjustments to the appraised or assessed value of comparable land. In other cases, the loss is based on the discounted present value of future profits based on specific development plans. Since the property value of undeveloped land reflects the discounted value of future profits, the two approaches are equivalent in concept. For each intended unit, the estimated loss in property value due to the cave animals listing and the intended designation is presented below.

The analysis of lost property values focuses only on the land in or around the intended units. In some cases, developers may be able to increase the density of their projects to fully or partially offset the loss of developable land (e.g., projects associated with Units 2, 6 and 8). In some cases, abutting land may be available to them to expand the project area so that any development affected by critical habitat can be relocated (e.g., projects associated with Units 2 and 10). However, this may require additional environmental studies and land-use approvals (e.g., the project associated with Unit 2). In other cases, other developers in the region may fill the demand. The net effect will be offsetting increases in property values, some of which may accrue to the developers and landowners who lose development due to the intended critical habitat. These offsetting increases in property values are not estimated since the specific properties that will benefit are not determinable.

As noted above, the Service indicates that, for biological reasons, it intends to modify the proposed cave animal critical habitat by reducing the area from 4,193 acres to 272 acres. This will significantly reduce the amount of development affected by critical habitat and, as a result, will significantly reduce the indirect costs The material below and Table Add-3 present revised estimates of the indirect costs based on the intended designation.

<u>4.a. Impacts on Development</u>

Chapter VI, Section 4.b. of the DEA discussed the potential indirect impacts on development projects that are planned within the proposed critical habitat designation. In order to illustrate the potential impacts on development, the DEA estimated that between 25 and 50 percent of all development planned within the proposed critical habitat would not proceed. The resulting economic impacts were estimated to be large because the proposed critical habitat encompassed most of the resort/residential development planned for the Po‘ipu/Koloa area.

Compared to the proposed designation, the intended designation is concentrated in a much smaller area that encompasses specific caves, mesocaverns, and surrounding areas that are deemed by the Service to be essential to the conservation of the cave animals. Furthermore, most of the intended units are known by the Service to be *occupied* by one or both of the cave animals.

Because the intended designation is much smaller than the proposed designation, only a few development projects have components in critical habitat. Also, landowners and developers will have greater flexibility in planning their projects so as to avoid adverse impacts on critical habitat or their projects. The impacts on development and the associated costs for each unit are discussed below.

4.a.(1) Intended Units 1 and 3

Both of these intended units are owned by A&B and are within the planned Kukui'ula development site. However, there are no plans for development in these intended units because they contain significant archaeological resources. Correspondingly, this analysis estimates no loss of development and no loss of land value in intended Units 1 and 3.

4.a.(2) Intended Unit 2

Intended Unit 2 is also owned by A&B and is contained within the planned Kukui'ula development site. Approximately 8.3 acres of this 16.3-acre intended unit are being managed to promote the conservation of the cave animals under a conservation agreement between Kukui'ula Development Company (a subsidiary of A&B) and the Service (Service, 2002). One of the terms of the agreement indicates that A&B will not develop the subject 8.3 acres. Although the conservation agreement expires in 2005, A&B indicates a willingness to renew the conservation agreement (A&B, 2002). Since the original conservation agreement was negotiated prior to the proposed designation of critical habitat, this analysis assumes that any loss of development potential in the 8.3 acres is attributable to baseline regulation.

Prior to the proposed designation of critical habitat, A&B planned to develop the remaining 8 acres of intended Unit 2 with an elementary school and a few single-family resort/residential homes. There are two caves in this 8-acre portion of intended Unit 2, but they are not known to be *occupied*. If this specific area is designated critical habitat, A&B indicates that it will not develop within the critical habitat. Since the area was planned for development, but will not be developed if the intended designation becomes final, this analysis assumes the loss of development potential in this portion of intended Unit 2 may be associated with the intended designation because of the potential effect of State and local laws.

A&B identified several adverse impacts associated with the proposed designation, but states that if the intended designation becomes final, "virtually all" of these adverse impacts will be avoided (A&B comment letter, 2002). This analysis assumes that A&B made this statement because the Kukui'ula Development project is still in the planning phases, and the loss of 8 acres of developable land can be partially offset by adjusting the planned density on the remaining 1,045 acres of the development site. In order to present a high estimate of the cost of the loss of 8 acres of developable land, this analysis assumes that A&B will not adjust the density elsewhere in the plans. Thus, the actual impact is likely to be an undetermined percentage of this high estimate.

Most of the 8 acres of intended Unit 2 are planned for a school site. A&B indicates that they will move the planned school site to another area, thereby displacing planned development elsewhere in their project. This analysis estimates that A&B will not develop a total of approximately 8 acres that are currently planned for single-family resort/residential homes.

The average density of lost development will be approximately four units per acre (A&B, 2003). Based on information provided by A&B and the selling values of comparable units across the State, this analysis estimates that the selling values of these resort/residential units will average approximately $900,000 per unit. Assuming a profit percentage of 10 to 15 percent, the total future profit associated with developing in intended Unit 2 ranges from $2.9 million to $4.3 million (8 acres x 4 units per acre x $900,000 per unit x 10%; 8 acres x 4 units per acre x $900,000 per unit x 15%).

The timing of potentially displaced development is uncertain. Based on the current status of the Kukuiʻula project and on information from A&B, it is assumed in this analysis that the displaced development would begin in 2007, and continue through 2020. Assuming these profits would have been accrued evenly over those 14 years, and using a 7-percent discount rate, the present value of the lost profits ranges from $1.4 million to $2.0 million. This range represents the high estimate of the loss in property values indirectly associated with the intended designation. As mentioned above, A&B might be able to adjust the density of other portions of the project to partially offset the loss in units and future profits.

4.a.(3) Intended Unit 4

This intended unit contains portions of two parcels that are owned by KG Kauaʻi Development, LLC (KGKD). KGKD plans approximately four single-family homes in the 1.1-acre portion of the northern parcel. KGKD also plans to construct part of a nine-hole golf course (to expand the existing 18-hole Kiahuna Golf Course) on the 4.8-acre portion of the southern parcel. However, intended Unit 4 contains a lava tube where the cave animals have been observed prior to the designation of critical habitat. Since all of this unit is known to be *occupied* by the cave animals, any indirect impacts to development is attributable to baseline regulation and thus is not considered in this analysis.

4.a.(4) Intended Unit 5

All of intended Unit 5 is part of the existing Kiahuna Golf Course and is managed to conserve the cave animals. Specifically, the entrance to the cave has been gated; informational signs have been posted; and the area above the cave has been planted with native vegetation that is likely to provide food for the Kauaʻi cave amphipod (Service, 2002). This analysis considers a golf course to be the highest and best use of the property, so the intended designation would have no impact on the development potential of intended Unit 5.

4.a.(5) Intended Unit 6

All 3.7 acres of intended Unit 6 cover a portion of the E.A. Knudsen Trust (Knudsen) planned Po'ipulani resort/residential development. The entire project is in the 2000 *Kaua'i General Plan;* most of the development is in the State Urban District; and the county has granted zoning for the Urban land (Knudsen, 2002). However, a portion of the project area is in the Agricultural District and does not have appropriate zoning. Given the circumstances, it is assumed in this analysis that, absent the designation of critical habitat, the developer would obtain the necessary State Urban Districting for the remaining land, obtain the necessary county zoning, and proceed with development within the timeframe of this analysis.

The Service indicates that the occupancy status of Unit 6 is currently unknown, because the lava tube it contains has not been surveyed by anyone familiar with the cave animals. This analysis conservatively assumes that the lava tube is *unoccupied*, so any loss of development potential may be indirectly associated with critical habitat if the developer is unable to securing the necessary zoning changes that would allow development based entirely on the designation.

Based on the draft master plan for the project, intended Unit 6 contains a lava tube with archaeological resources, other archaeological sites, and buffer areas to protect the archaeological sites from development. The remaining portion of intended Unit 6 contains or affects five lots on 2.5 acres that would be developed absent the intended designation (PBR Hawai'i, 2002).

As mentioned above, development of this project will require State redistricting of land from the Agricultural District to the Urban District and a county zoning change. When making a decision on redistricting, the State Land Use Commission (LUC) must consider (1) "the preservation or maintenance of important natural systems or habitats;" (2) the "provision for employment opportunities and economic development;" and (3) the "provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups" along with other considerations (HRS 205-17).

A related concern is that the county will view land in the intended designation differently when making decisions on zoning changes. The 2000 *Kaua'i General Plan* indicates that the county will request expert advice from the State Department of Land and Natural Resources (DLNR) about rare and endangered species in regulating land use on urban and agricultural lands. DLNR may in turn seek advice from the Service. Depending on the advice the county receives, it may impose certain conditions on development.

Based on conversations with experts who are experienced in dealing with the LUC and county councils, this analysis presents two scenarios regarding potential LUC and county actions. In the first scenario, the LUC and the county will approve the development, but only if Knudsen agrees to reduce the impact of development on critical habitat. This could be done by using post tension (PT) concrete slabs or post-and-pier construction techniques as described in Section 2.b.(5) of the DEA. These techniques would minimize impacts to the cave structures and to the cave animals, and can be done at little or no additional cost to the developer. Thus, as a low estimate, Knudsen would be able to continue with the development in critical habitat as planned.

In the second scenario, the LUC and/or the county would require that no development occur in intended Unit 6 as a condition of the required approvals. The economic costs associated with this scenario are discussed below.

As mentioned above, the loss of development potential in intended Unit 6 will affect five single-family home lots. Based on discussions with the developer and on information from similar projects, this analysis estimates that profit per unit to the developer would be about $100,000 per home. Thus, the loss of five lots would result in a loss of about $500,000 in profits (5 x $100,000).

The timing of the development in intended Unit 6 absent the intended designation is uncertain. Based on the current status of the Poʻipulani project and discussions with Knudsen, this analysis assumes that sales in and around intended Unit 6 would begin in about 6 years and would be completed 6 years after that. Assuming that profits would have been accrued evenly over this period, and using a 7-percent discount rate, the present value of the lost profits is $274,000. This loss may be partially offset if Knudsen is able to increase the density of the planned development in the remaining 190-acre Poʻipulani project site. Thus, the loss of $274,000 in property values may overstate the actual effect on Knudsen.

This analysis assumes that without critical habitat, a few homes might sell at a premium because they would front open space provided by the buffer around the lava tube and other archeological sites. This analysis further assumes that with the intended critical habitat, the number of homes that front open space would stay about the same or decrease. Thus no adjustment is made for higher profits for homes that front open space.

As mentioned above, Knudsen may be able to continue with development plans using certain construction techniques that minimize impacts to the cave animals. The cost associated with this scenario is roughly zero. Alternatively, if Knudsen is not able to develop in intended Unit 6 because of the actions of the LUC and/or county authorities, the cost would be the present value of the net loss in future profit associated with Unit 6, or roughly $274,000. This analysis regards the high estimate as accurate within about 20 percent, resulting in a loss of property value ranging from $219,000 to $329,000.

4.a.(6) Intended Unit 7

Intended Unit 7 contains undeveloped land owned by the Roman Catholic Church. The Church indicates that it has no plans to develop the land that is currently in the Agricultural District. The land has some development potential because it could be redistricted to the Urban District by the LUC. However, as mentioned above in the discussion regarding intended Unit 6, the LUC and/or the county could impose conditions that make development infeasible. In this case, the possible future loss in development potential would reduce the current value of the property.

Alternatively, the State could decide to redistrict the land to the Conservation District as mentioned in Section 4.b.(1) of the DEA. The parcel in critical habitat is currently assessed by the county at $20,500 per acre, which is the approximate market value of the land (County of Kaua‘i, 2000). Based on the value of land in the Conservation District, this analysis estimates that the land value would drop to roughly $500 per acre if it had no development potential or if it were redistricted to the Conservation District; thus, if the LUC or the county were to take actions reducing the property's value, the loss would be $20,000 per acre. The total impact for the 8.6 acres in critical habitat would be $172,000 (8.6 acres x $20,000 per acre). This analysis regards the estimate as accurate within about 10 percent, resulting in a loss of property value ranging from $155,000 to $189,000 for Unit 7. If better information becomes available regarding how the LUC and the county will handle development approvals for land in critical habitat, the loss in property values could be less severe. For example, if the LUC decides in a similar case that development can occur as long as the developer uses PT concrete slabs or post-and-pier construction techniques, potential buyers will perceive that the land in intended Unit 7 does have some development potential, and the property values may return to their current level. Thus, the long-term loss in property values may be some undetermined fraction of the $155,000 to $189,000 mentioned above.

4.a.(7) Intended Unit 8

Resort/Residential Development

Unit 8 covers a portion of the planned Po‘ipulani resort/residential development mentioned above. A lava tube and a 50-foot buffer around the lava tube must already be protected because the area contains significant archaeological resources (Service, 2002). Based on a draft master plan of the project, intended Unit 8 contains or affects 13 lots on roughly 6.5 acres that would be developed absent the intended designation.

The Service indicates that the occupancy status of Unit 8 is currently unknown, because the lava tube it contains has not been surveyed by anyone familiar with the cave animals. This analysis conservatively assumes that the lava tube is *unoccupied*, so any loss of development potential may be indirectly associated with critical habitat if the developer is unable to secure the necessary zoning changes that would allow development based entirely on the designation.

As with intended Unit 6, this unit is in the Agricultural District and will require a change to the Urban District from the LUC and a zoning change from the county before development can proceed as planned. As discussed above, the LUC and the county may require that Knudsen use PT slabs or post-and-pier construction techniques in order to minimize impacts to the cave animals. These construction techniques could be used at little or no additional cost to the developer.

However, an interior access road is currently planned in intended Unit 8. As mentioned in the Roads subsection in the Direct Costs section above, using PT concrete to build a road is significantly more expensive than using asphalt. Knudsen may be unable to adjust the configuration of the current plan to build the road outside of the intended unit. If the road is not built, some of the planned units will not be accessible and also will not be built. Alternatively, LUC and/or the county could require that no development occur in intended Unit 8 as a condition of the required approvals. In these cases, there will be a loss of planned development in and around intended Unit 8. The cost of the possible loss in development associated with these potential actions by LUC and/or the county is discussed below.

If development cannot occur in Unit 8, this analysis estimates that eight lots would be directly affected and five lots north of intended Unit 8 would be indirectly affected because it would be too expensive to build an access road to service just five lots (an additional $98,500 per lot based on 800 feet of interior road, $1,000 per foot of roadway, and the cost shared among five lots instead of 13 lots).

Assuming profits of about $100,000 per unit, the loss of 13 lots would result in a loss of about $1.3 million in profits (13 x $100,000).

The timing of the development in Unit 8 is uncertain. Based on the current status of the Po‘ipulani project and discussions with Knudsen, it is assumed in this analysis that the development in and around Unit 8 would begin in 15 years, and would be completed about 3 years later. Assuming profits would have been accrued evenly over time, and using a 7-percent discount rate, the present value of the lost profits is about $427,000. This loss may be partially offset if Knudsen is able to increase the density of the planned development in the remaining 190-acre Po‘ipulani project site. Thus, the loss of $427,000 in property values may overstate the actual effect on Knudsen.

This analysis assumes that without critical habitat, a few of the homes might sell at a premium because they would front open space provided by the buffer around the lava tube. This analysis further assumes that with the intended critical habitat, the number of homes that front open space would stay about the same or decrease. Thus no adjustment is made for higher profits for homes that front open space.

As mentioned above, Knudsen may be able to continue with development plans, if the LUC and/or county do not take actions to prevent it, using certain construction techniques that minimize impacts to the cave animals. The cost associated with this scenario is roughly zero. Alternatively, if Knudsen is not able to develop in intended Unit 8, the cost would be the present value of the net loss in future profit associated with Unit 6, or roughly $427,000. This analysis regards this high estimate as accurate within about 20 percent, resulting in a loss of property value ranging from $342,000 to $512,000.

<u>Residential Development</u>

The State owns approximately 1.1 acres in intended Unit 8 and plans a residential development as part of the Weliweli expansion. Since the land is zoned R-6, the acreage can accommodate about six homes. The land also has State Urban Districting and county General Plan

Designation. The State could decide to continue with development in intended Unit 8 using construction techniques that minimize impacts to the cave animals, at little or no additional cost.

Alternatively, the development potential of this land could be lost because the State may decide not to develop in the intended designation for political reasons or to promote the conservation of the cave animals. In this scenario, which is indirectly associated with the designation, this analysis anticipates that the economic cost would be the loss in property value. Based on comparable parcels in Koloa, this analysis estimates the land to have a value of about $100,000 per acre. If the development potential for this lot were lost, this analysis estimates that the land would be assessed at roughly $500 per acre. Thus, the total economic loss would be about $109,000 (1.1 acres x ($100,000 per acre – $500 per acre)). This analysis regards the estimate as accurate within about 20 percent, resulting in a loss of property value ranging from $87,000 to $131,000.

However, it is expected that the Weliweli expansion will be planned to have a certain amount of open space. The developers could adjust the planned development to include some of the open space in intended Unit 8. If there was no change in the number of housing units, this would tend to partially offset the loss in property value estimated above.

Thus, the total economic cost could range from roughly zero to $131,000.

4.a.(8) Intended Unit 9

Intended Unit 9 comprises the open field of a county park. Since this area has little or no development potential, this analysis anticipates that there will be little or no economic cost associated with the intended designation.

4.a.(9) Intended Unit 10

Intended Unit 10 contains areas planned for the development of one single-family home and a 7-acre commercial development. The remainder of this intended unit is not currently planned for development but has development potential. The economic costs associated with each of these areas are discussed below.

The Service believes Unit 9 contains a cave once used as a Civil Defense shelter, although the exact location of the cave and whether it is *occupied* by the cave animals is unknown. As such, this analysis conservatively assumes that any potential impacts may be indirectly associated with critical habitat if the landowner is unable to securing the necessary permits that would allow development based entirely on the designation.

<u>Residential Development</u>

A private landowner owns approximately 2.1 acres in intended Unit 10 and plans to build a single-family home on the lot in the near future. Development on this lot will not require discretionary approvals from the State, but it will require a building permit from the county. As mentioned above, the county may require that the developer use construction techniques that minimize impacts to the cave animals. The landowner may be able to use these techniques with little or no additional costs.

Alternatively, the county may not grant the building permit or it may impose conditions that make development infeasible. Or, the landowner may decide not to develop in critical habitat due to perceived risks of a lawsuit or other concerns. The economic cost of these scenarios would be a loss in property value. The entire 2.4-acre lot is currently assessed by the county at $160,000, which is the approximate market value of the lot (County of Kaua‘i, 2000). If the land were redistricted to the Conservation District, this analysis estimates that the land would be assessed at roughly $500 per acre, or $1,200 for the entire lot. Thus, the total economic loss in that scenario would be about $159,000. This analysis regards the estimate accurate within about 10 percent, resulting in a loss of property value, as a result of the LUC and/or county's action, ranging from $143,000 to $175,000.

Thus, the total economic cost will range from roughly zero to $175,000.

<u>Commercial Development</u>

Grove Farm plans an eventual commercial development on approximately 7 acres it owns in the southeastern portion of intended Unit 10. This site is at the northeast corner of the intersection between the Koloa Bypass Road and the Weliweli Road. Grove Farm also plans commercial development on the southeast and southwest corners of the same intersection, but these intersections are not within intended Unit 10. The commercial development at this intersection is in the Agricultural District; it is not included in the 2000 *Kaua‘i General Plan;* and it does not have county zoning. Even though the project is not currently entitled, the land has value because there is a possibility these approvals will be obtained in the future.

The designation of critical habitat could indirectly cause a loss in the development potential and property values, due to (1) a lower probability of obtaining State and county development approvals, (2) more expensive conditions on development, and (3) a risk of having the parcel redistricted to Conservation.

Comparable land in Po‘ipu that is planned for commercial development, and which has the same entitlements, has been appraised at about $250,000 per acre (data from Grove Farm, 2003). However, intended Unit 10 is close to Koloa Town, while the comparable land is close to a tourist area in Po‘ipu. Since this analysis expects that commercial development near Po‘ipu is likely to be more profitable than commercial development near Koloa Town, this analysis estimates that the land in intended Unit 10 is worth roughly 60 percent of the comparable land, or about $150,000 per acre. If the development potential in the 7 acres planned for commercial development in this intended unit were lost, this analysis estimates that the land value would decrease to about $500 per acre. Thus, the loss in property value would be roughly $1 million (7 acres x ($150,000 per acre – $500 per acre)). This analysis regards the estimate as accurate within about 20 percent, resulting in a potential loss of property value ranging from \$800,000 to \$1.2 million.

Grove Farm owns much of the land along the Koloa Bypass Road and along Weliweli Road. If development could not occur in intended Unit 10, Grove Farm might pursue approvals for a commercial site outside critical habitat. The associated increase in property value could partially offset the loss in intended Unit 10.

If better information becomes available regarding how the State and County, with advice from the Service, intends to handle development in critical habitat, the loss in property values could be less severe. For example, if the LUC decides in a similar case that development can occur as long as the developer uses PT concrete slabs or post-and-pier construction techniques, potential buyers will perceive that the land in intended Unit 10 does have some development potential, and the property values may return to their current level. Thus, the long-term loss in property values may be some undetermined fraction of the \$800,000 to \$1.2 million mentioned above.

<u>Unplanned Agricultural Land</u>

The remaining 26.1 acres in intended Unit 10 are currently unplanned but have development potential due to their proximity to existing development and infrastructure. The land is in the Agricultural District and development would require an amendment to the *2000 Kaua'i General Plan* (County of Kaua'i, 2000). Based on comparable parcels on Kaua'i, this analysis estimates the land to have a value of about \$50,000 per acre. If the development potential were lost due to actions of the LUC and/or county because of their concern over the fact that the area was designated as critical habitat, this analysis estimates that the property value would drop to roughly \$500. The total loss in property value associated with a loss in development potential is \$1.3 million (26.1 acres x (\$50,000 per acre – \$500 per acre)). This analysis regards the estimate as accurate within about 20 percent, resulting in a loss of property value ranging from \$1 million to \$1.6 million.

There is a significant amount of unplanned agricultural land in the Koloa area, so the loss in development potential in intended Unit 10 could lead to a partially offsetting increase in development potential in another area. Alternatively, as discussed above, the long-term loss in property values associated with critical habitat could be less severe if better information becomes available regarding how the State and county, with advice from the Service, intends to handle development in critical habitat. Thus, the long-term loss in property values may be some undetermined fraction of the \$1 million to \$1.6 million mentioned above.

4.a.(10) Intended Units 11 and 12

Both of these units contain the remnants of ancient cinder cones (or *pu'u*) owned by Grove Farm. These cinder cones are not currently in economic use, and Grove Farm indicates that there are no plans for economic use in the future. However, a golf course and resort/residential development will border a portion of the cinder cones. Given the circumstances, this analysis anticipates that there will be no loss in development associated with the intended designation.

4.a.(11) Intended Unit 13

Most of intended Unit 13 is in the Conservation District along the Maha‘ulepu shoreline except for approximately 5.5 acres in the Agricultural District. Grove Farm owns most of the Agricultural land, which contains significant archaeological resources associated with a limestone sink hole (Service, 2003). Also, this land is adjacent to an existing limestone quarry and natural drainage (Grove Farm, 2002). The remaining Agricultural land is part of a small, developed lot with a single-family vacation home. However, the Service indicates that a developed home lot is not considered part of the critical habitat.

Accordingly, this analysis anticipates that there will be little or no economic costs associated with the intended designation.

4.a.(12) Intended Unit 14

Most of intended Unit 14 is in the Conservation District along the Maha‘ulepu shoreline except for about 22.4 acres in the Agricultural District. The agricultural land is on the side of a low coastal hill facing inland toward Aweoweonui Valley. Because of steep slopes, this land is not used for grazing or other agricultural activities (Grove Farm, 2003). In addition to the steep slopes, the soils are unstable which makes the land unsuitable for development (Grove Farm, 2003).

Consequently, this analysis anticipates that there will be little or no economic cost associated with the intended designation.

4.a.(13) Summary

The indirect impact of the intended designation will be different for each intended unit, and will depend on future decisions made by State and county agencies and the landowners and developers. A loss in development potential for the land in and near the intended critical habitat could cause a decrease in property values soon after the designation becomes final. However, the designation may have little or no effect on certain parcels. This analysis estimates the range of losses in property values that could be indirectly associated with the intended designation as follows:

— **Intended Unit 1:** No loss in property value
— **Intended Unit 2:** \$1.4 million to \$2 million
— **Intended Unit 3:** No loss in property value
— **Intended Unit 4:** No loss in property value
— **Intended Unit 5:** No loss in property value
— **Intended Unit 6:** An undetermined fraction of \$329,000
— **Intended Unit 7:** \$155,000 to \$189,000

- **Intended Unit 8, Resort/Residential Development:** An undetermined fraction of $512,000
- **Intended Unit 8, Residential Development:** An undetermined fraction of $131,000
- **Intended Unit 9:** Little or no loss in property value
- **Intended Unit 10, Planned Residential:** An undetermined fraction of $175,000
- **Intended Unit 10, Planned Commercial:** $800,000 to $1.2 million
- **Intended Unit 10, Unplanned Agricultural Land:** $1 million to $1.6 million
- **Intended Unit 11:** No loss in property value
- **Intended Unit 12:** No loss in property value
- **Intended Unit 13:** Little or no loss in property value
- **Intended Unit 14:** Little or no loss in property value

The total potential loss in property values, that could be indirectly associated with the designation ranges from $4.5 million to $6.1 million. This loss may be partially offset by associated increases in the property values of parcels outside of the intended designation and are estimated based on the assumption that landowners would be unable to secure the necessary zoning changes or permit approvals from local government entities entirely due to indirect effects associated with the designation.

4.b. Property-Tax Revenues

Chapter VI, Section 4.p.(9) of the DEA discussed the losses in tax revenues to the County of Kauaʻi as a result of losses in island wide development and economic activity associated with the indirect impacts of the proposed designation. As discussed in the Impacts on Development section above, this analysis estimates that a loss in development potential in the intended designation would result in a loss in property values. However, any development that does not occur in the intended designation is expected to occur elsewhere on Kauaʻi. Since this will result in an offsetting increase in property values, this analysis concludes that the net change on county tax revenues will be small.

4.c. Islandwide Loss of Development

Chapter VI, Section 4.c. of the DEA discussed the estimated islandwide loss of development and economic activity as a result of potential restrictions associated with State land districting, county development permits and approvals, HCPs, and project financing. The DEA anticipated a substantial loss of development due to the size of the proposed critical habitat.

As discussed in Section 4.a. above, this analysis estimates the anticipated loss of development as a result of the intended designation to be much less. Specifically, this analysis expects that, because of the intended designation, the following development will not occur: about 50 resort/residential homes in or near Units 2, 6, and 8; about seven residential homes in Units 8 and

10; and about seven acres of commercial space in Unit 10. However, the analysis anticipates that other developments in the Koloa/Po‘ipu area will increase in density or area to offset this loss to satisfy the demand for resort/residential, residential, and commercial development. Thus, this analysis concludes that the islandwide loss of development and economic activity due to the indirect impacts of the intended designation will be negligible.

4.d. Costs and Delays for Successful Projects

Chapter VI, Section 4.d. of the DEA discussed the concern that successful projects would be subject to additional costs and delays as a result of environmental reviews and litigation stemming from the proposed critical habitat designation. This analysis anticipates that, since only small portions of a few projects remain in the intended designation, any costs and delays associated with environmental review and litigation will be small.

4.e. Other Residential, Commercial and Industrial Development

Chapter VI, Section 4.e. of the DEA discussed the possibility that other projects in critical habitat could be affected indirectly by the proposed designation, including: the Po‘ipu Shopping Village, industrial development at the Old Koloa Mill, redevelopment in Koloa Town, and commercial development at the intersection of the Poi‘pu Bypass and Poi‘pu Road. These projects are no longer included in the intended designation and, as a result, this analysis estimates the indirect cost to the landowners and developers of the indirect impacts of the intended designation to be zero.

As indicated in the Impacts on Development Section above, a small portion of the planned Weliweli Expansion remains in Unit 8, and a home and commercial development are planned in Unit 10. The economic impacts on the affected landowners are discussed in that section.

4.f. Agriculture

Chapter VI, Section 4.f. of the DEA indicates that the demand for island-grown produce on Kaua‘i would grow more slowly as a result of slower economic and population growth resulting from the indirect effects associated with the proposed designation. As mentioned above, with the intended reductions in critical habitat, a slowdown in economic and population growth is no longer anticipated.

The Service indicates that continued grazing in areas that have been grazed previously is not likely to adversely affect the cave animals, so this analysis assumes that the grazing activities in Units 6, 8 and 10 will continue. Grazing and farming do not take place in the other intended units, nor does this analysis anticipate that they will take place in the future.

4.g. Underground Storage Tanks (USTs)

Chapter VI, Section 4.g. of the DEA indicated that underground storage tanks (USTs) might have to be built above ground as a result of the indirect impacts of the proposed designation. Most developments requiring USTs are no longer in the intended designation. However, a gas station might be proposed as part of the commercial development planned for the southeastern corner of Unit 10. If such a gas station is built, any USTs may have to be installed above ground or outside critical habitat, as suggested in the DEA. Since Grove Farm owns much of the land along the Koloa Bypass Road and Weliweli Road, this analysis assumes that it would be feasible to find an another site.

4.h. Contesting Redistricting

Chapter VI, Section 4.i. of the DEA discussed the costs associated with the possibility of an estimated 76 landowners contesting redistricting, a potential indirect impact of the proposed designation. The number of private landowners in the intended critical habitat is now seven. As indicated in the DEA, each landowner could spend approximately $50,000 to contest redistricting. Based on the number of private landowners in the intended critical habitat, the cost to contest redistricting drops to at most $350,000 (7 x $50,000) over the 18-year period of analysis.

Realistically, redistricting may or may not be proposed by the State, and if it is proposed, some landowners may acquiesce to the redistricting if development or economic activity is not feasible within the affected parcel. As a result, this analysis estimates that zero to one landowners will actually oppose redistricting, for a total cost of between $0 to about $50,000 over the 18-year period of analysis (1 landowner x $50,000).

4.i. Land Management for Conservation

Chapter VI, Section 4.j. of the DEA discussed possible costs associated with managing all of the caves and land in critical habitat for the benefit of the cave animals. The DEA concluded that such costs could occur as a result of court-ordered conservation management, although the probability of such a court order was undetermined.

Although the costs of conservation management were presented in the DEA for the purposes of illustration, this analysis assumes that these costs are not reasonably foreseeable. In particular, the Service's most recent legal interpretation of the Federal and State endangered species protection statutes, as well as the impact of the *Palila* case on their implementation, suggests that there is no precedent for habitat degradation to constitute "harm" under either statute. Furthermore, the State statute lacks a provision for citizen lawsuits. Finally, there is no Federal, State, or county law or regulation that mandates conservation management for critical habitat. As such, this analysis concludes that mandated conservation management based on critical habitat designation is not likely.

4.j. State and County Environmental Review

Chapter VI, Section 4.k. of the DEA discussed the concern that the proposed designation would result in an expansion in scope of certain environmental analyses, and a corresponding increase in costs. Further, the DEA estimated the additional costs to prepare an Environmental Impact Statement (EIS) instead of a less detailed and shorter Environmental Assessment (EA). The DEA estimated that 13 projects in critical habitat would require an EIS.

However, with the intended designation, almost all of the 13 projects identified in the DEA are no longer in critical habitat. This analysis anticipates that only the Koloa Bypass Road widening project and one commercial development in Unit 10 are likely to undergo environmental review. The other projects in the intended designation will not require an EA or EIS because they are not projects that: (1) use State or county lands or funds; (2) are in the Conservation District; (3) are in the Shoreline Setback Area (usually 40 feet inland from the certified shoreline); (4) require an amendment to the *2000 Kaua'i General Plan* that would designate land to some category other than agriculture, conservation or preservation; or (5) involve reclassification of State Conservation District lands. Based on the costs of additional environmental review discussed in the DEA, this analysis estimates the cost of environmental review for the two projects in the intended designation to be between $50,000 and $150,000 for the 18-year time period of the analysis.

Knudsen will have to prepare an environmental analysis similar to an EA as part of a petition to the Land Use Commission (LUC) to redistrict land planned for the Po'ipulani development from the Agricultural District to the Urban District. The LUC is likely to request a more extensive review as a result of the intended designation. However, the additional cost of the more extensive review is not currently known.

4.k. Reduced Property Values

Chapter VI, Section 4.l. of the DEA discussed the concern that land in critical habitat would lose value as an indirect impact of the proposed designation. The estimated loss in property value associated with the intended designation is presented above in the Impacts on Development section.

4.l. Condemnation of Property

Chapter VI, Section 4.m. of the DEA discussed the concern that, after critical habitat is designated, the Service would eventually condemn private property at depressed land values. As stated in the DEA, the Service is not proposing nor is it contemplating purchasing land being proposed for critical habitat. When the Service does purchase private property, the normal practice is to do so only when (1) the landowner is willing to sell the land, and (2) the price and other terms are acceptable to the landowner. The intended designation and the new information obtained since the publication of the DEA do not change this assessment.

4.m. Investigating Implications of Critical Habitat

Chapter VI, Section 3.n of the DEA discussed the costs to private landowners to hire attorneys or use their own professional staff to investigate the implications of critical habitat. The DEA estimated these costs to be on the order of $225,00 to $526,000 for the 18-year period of the analysis. This estimate was based on a total of 76 private landowners in the proposed critical habitat. While some of them own extensive acreage in Hawai‘i and are familiar with the Act, the DEA assumed that most of them would investigate the potential impacts on their properties. The cost estimate in the DEA was based on the following assumptions: (1) about six of the major landowners and their consultants would spend an average of 100 to 160 hours investigating the implications of critical habitat; (2) about 50 of the remaining landowners would spend an average of 15 to 25 hours investigating the implications; (3) professional rates were $150 to $200 per hour; and (4) Service staff would spend an average of four to ten hours at $100 to $150 per hour responding to inquiries from each landowner.

By the time the final rule to designate critical habitat is published, the private landowners may have spent a considerable amount of time and money investigating the implications of critical habitat, preparing public comment letters, and obtaining biological and geological information about the cave animals and their habitat. Given this, much of the cost will not be associated with the final critical habitat designation. However, some landowners may continue to investigate the implications of the final critical habitat designation as (1) new projects and land uses are proposed in critical habitat; (2) potential lawsuits are filed regarding critical habitat; and (3) new information about the cave animals and their habitat becomes available.

Since the intended designation is considerably smaller than the proposed designation, the number of private landowners drops to just seven. This analysis estimates the cost to further investigate the implications of the intended critical habitat to be $19,000 to $55,000 over the 18-year period of analysis based on the following assumptions: (1) four major landowners will spend an average of 20 to 40 hours investigating the implications of the final designation; (2) the remaining three landowners will spend an average of 10 to 20 hours investigating the implications of the final designation; (3) professional rates are $150 to $200 per hour; and (4) Service staff will spend an average of 4 to 10 hours at $100 to $150 per hour responding to inquiries from each landowner.

4.n. Loss of Conservation Projects

Chapter VI, Section 4.o. of the DEA discussed the concern that ongoing activities of the Service to designate critical habitat would cause some landowners to decide not to engage in conservation projects with the Service, NRCS, and/or DLNR. The DEA indicated that while conservation projects may be lost in other parts of Hawai‘i due to critical habitat, the cave animals critical habitat designation may actually increase landowner and developer participation in conservation projects because it may enhance their chances in obtaining State and county approvals for their development projects located within critical habitat. However, the amount of development planned in the intended designation is significantly less that the proposed designation, so the DEA's conclusions are no longer accurate for the intended designation.

As discussed in the Impacts to Development section above, it is possible that the intended designation could reduce the amount of development planned by three landowners in Units 2, 6, 8, and 10. As discussed in Section 3.a. above, these landowners may take advantage of Federal funds to landscape the resulting open areas. However, it is not clear whether these landowners would have participated in such projects absent the designation of critical habitat. As such, this analysis is not able to determine whether these projects constitute an increase in conservation projects relative to a no-critical-habitat scenario.

5. COSTS TO SMALL ENTITIES

Chapter VI, Section 5 of the DEA discussed the potential impacts on small entities. Some of these small entities are no longer impacted because certain areas that were in the proposed designation are no longer in the intended designation. The following is a revised assessment of the costs to small entities.

5.a. Entities Potentially Impacted

The analysis in the DEA, as revised in this Addendum, is based on a review of all projects, activities, land uses and entities that may be directly regulated by the implementation of section 7 for the cave animals. Based on this review, the list below presents the projects, activities, and land use that could be impacted by the intended critical habitat designation (Table Add-2), and the entities associated with these impacts organized by type of activity:

Federal:

— Service (All projects, activities, land uses)
— NRCS (USDA conservation programs)
— FHWA (Funding road projects)
— ACOE (Planned golf courses)

County:

— DPW (Road projects)

Private:

— Grove Farm (Partial funding of a survey for a conservation project)
— KGKD (Planned golf course)

5.b. Small Entities Potentially Impacted

The RFA/SBREFA considers “small entities” to include small governments, small organizations, and small businesses (5 U.S.C. §601). The following discussion examines each directly regulated entity from the list above to determine whether it would be considered “small” under the RFA/SBREFA.

5.b.(1) Federal Agencies

For the purposes of the RFA/SBREFA, Federal agencies are not considered small governments. Accordingly, the Service, NRCS, FHWA, and ACOE are not considered further in this portion of the economic analysis.

5.b.(2) County Agencies

The RFA/SBREFA defines "small governmental jurisdiction" as the government of a city, county, town, school district, or special district with a population of less than 50,000. Kaua‘i County has a population greater than 50,000 (see Chapter II of the DEA). Accordingly, county agencies such as the DPW are not considered "small entities."

5.b.(3) Private

Several private entities on Kaua‘i are directly subject to the section 7 implementation for the cave animals. A determination of whether the private entities impacted are small entities according to SBA definitions is made below.

The primary business activity of Grove Farm is real estate asset management. The SBA defines a business in the real estate asset management industry as small if its annual sales are less than $1.5 million. According to this definition and 2000 sales information, Grove Farm is <u>not</u> a small business (Dun & Bradstreet, 2002).

KGKD is affiliated with Kobayashi Group, LLC (Kobayashi). Kobayashi’s primary business activity is real estate asset management. The SBA defines a business in the real estate asset-management industry as small if its annual sales are less than $1.5 million. Kobayashi is a private business, and its annual sales figures are not listed in the Dun & Bradstreet database. However, the Kobayashi Group owns the following properties: two hotels in Waikiki, the Ocean Resort Hotel Waikiki (450) rooms, and the Queen Kapiolani Hotel (314 rooms); three golf courses; developable land in Koloa; and possibly other property. Rough estimates of the revenues generated from these properties suggest that annual revenues for the Kobayashi Group are at least $24 million [(764 rooms x 70% occupancy x $100 per room x 365 days) + (3 golf courses x 30,000 rounds of golf per year x $50 per round) = $24 million per year]. According the RFA/SBREFA regulations, the SBA counts the receipts of the business whose size is at issue and those of all its affiliates in determining the size of the business. Therefore, KGKD and Kobayashi are <u>not</u> small businesses.

<u>5.c. Potential Impacts on Small Entities</u>

Based on the above analysis, there are no small entities that may be impacted by implementation of the section 7 provisions of the Act for the cave animals. Therefore, implementation of section 7 for the cave animals will not have a significant economic impact on a substantial number of small entities.

6. BENEFITS

Chapter VI, Section 6 of the DEA discussed the potential benefits that could result from the proposed critical habitat. Certain benefits are not likely to change with the intended designation. Specifically, these include: the benefits of species protection (Section 6.b of the DEA); reduced costs due to successful preservation (Section 6.c); and benefits to developers (Section 6.g). The categories of benefits that may change are discussed below.

<u>6.a. Environmental, Biological, and Other Benefits</u>

Chapter VI, Section 6.d. of the DEA discussed the possibility that if the implementation of section 7 for the cave animals results in a reduction or modification to development and farming, then this could result in environmental benefits and other benefits. Specific issues are discussed below.

6.a.(1) Maha‘ulepu Coast

As discussed in the DEA, the Maha‘ulepu coast is an attractive, undeveloped coastal area that is easily accessible to Koloa residents, even though the land and access roads are privately owned. Although resort development is proposed for a portion of Maha‘ulepu, current plans indicate that most of the coastal area will remain undeveloped (Grove Farm, 2002).

The intended designation does not include the Maha‘ulepu resort development. Therefore, this analysis concludes that the intended designation will offer little, if any, support for the argument that the portion of the Maha‘ulepu coast proposed for resort development should be preserved.

6.a.(2) Open Space

As mentioned in the DEA, by reducing the amount of resort, resort/residential, residential, commercial and industrial development in Po‘ipu and Koloa, the proposed critical habitat would contribute to maintaining open space. In turn, this could enhance the environmental quality of the area if the natural vegetation is attractive or if the undeveloped land is landscaped.

Section 4.a. above presents scenarios for the loss of development that could occur as a result of indirect impacts associated with the intended designation. If, as described in Section 4.a., no development were to occur a result of the intended designation, this analysis estimates that the amount of open space that will be preserved from development within the 18-year timeframe of this analysis will be limited to about 26.1 acres, including: 8.0 acres in Unit 2, 2.5 acres in Unit 6, 6.5 acres in Unit 8, and 9.1 acres in Unit 10.

The benefits of open space to adjacent properties are discussed in terms of an increase in property values in the Impacts on Development section above. However, this analysis anticipates that Kaua'i residents in general may value preserving open space. For example, in 1995, researchers at the University of Hawai'i at Manoa surveyed O'ahu residents to determine the open-space value of former sugarcane land. The study found that O'ahu households were willing to pay an average of 0.23 cent per year for the open space provided by one additional acre of agricultural land. The researchers found that this figure was a function of family income and available open space. That is, the willingness to pay increases with higher incomes and as open space becomes more scarce.

The results of this study can be applied to the open space that may be preserved by the implementation of section 7 for the cave animals. After adjusting for the income levels on Kaua'i (which are slightly lower than those on O'ahu), the amount of Agricultural land on Kaua'i (which is slightly higher than O'ahu), and inflation since 1995, this analysis estimates that Kaua'i residents may be willing to pay 0.221 cent per household per year for the open space provided by one additional acre of agricultural land. Using a 7-percent discount rate and the number of households on Kaua'i in 2000 (20,147), the present-value of one additional acre of open space to Kaua'i residents is $636 ((0.221 cent x 20,147 households) / 7%). However, the benefits associated with preserving open space depend upon the timing of the development projects that would otherwise occur. Assuming, on average, a period of 5 years before development occurs and a 7-percent discount rate, this analysis estimates that the adjusted present value of preserved open space for critical habitat for the cave animals is $453 per acre ($636 / (1 + 7%) ^ 5 years).

If the "no development" scenario did occur on the 26.1 acres due to the indirect impacts of the intended designation, then the total open-space value attributable to the cave animals would be roughly $11,800 (26.1 acres x $453 per acre). However, this analysis expects that most of the displaced development will likely occur elsewhere in Koloa, resulting in increased density or a loss of open space at these new locations. Thus, this analysis expects that the intended designation will result in open space benefits of less than $11,800.

6.a.(3) Soil Runoff and Chemical Runoff

The proposed critical habitat included considerable land planned for urban development, and considerable land used for farming and cattle grazing. As mentioned in the DEA, reductions in and modifications to development, landscaping, and agriculture due to the implementation of section 7 for the cave animals could decrease soil and chemical runoff. In turn, this could improve the marine environment.

The intended critical habitat includes comparatively little land planned for development, no farm land, and about 43 acres used for grazing (Units 6, 8 and 10). As explained in the Agriculture section above, the Service indicates that continued grazing will not adversely affect the cave animals, so this analysis assumes that grazing will continue in the intended designation. Also, this analysis expects that most development that might be displaced from the intended critical habitat will occur elsewhere in Koloa. Thus, any change in the amount of soil runoff and chemical runoff are estimated to be small.

6.a.(4) Traffic Congestion

As discussed in the DEA, less resort and residential development due to critical habitat would result in slower growth in the number of visitors to Kaua'i, slower economic and population growth, and slower growth in the volume of traffic.

Unlike the proposed critical habitat, the intended critical habitat includes only a small portion of the resort and residential development planned for the Poi'pu/Koloa area. Furthermore, this analysis expects that any development displaced from the intended critical habitat will occur elsewhere in Koloa. Thus, this analysis concludes that the implementation of section 7 for the cave animals will have little or no effect on the growth of tourism, the economy, the population, or the volume of traffic.

6.a.(5) Native Plants

As mentioned in the DEA, project modifications recommended by the Service include planting and irrigating native plants above caves and mesocaverns. This will contribute to the preservation and conservation of native plants.

6.b. Ecotourism

As mentioned in Chapter VI, Section 6.e. of the DEA, commercial hiking tours led by professional naturalist guides and featuring Hawai'i's ecosystems and endemic species are offered along the Maha'ulepu coast and elsewhere on Kaua'i. Since Units 13 and 14 contain portions of the Maha'ulepu coast, the intended critical habitat designation conceivably could benefit these ecotourism operations by providing a marketing dimension that would further enhance their appeal to visitors. However, this analysis expects the benefit to be slight inasmuch as (1) viewing the cave animals would be very difficult, given that they spend most of their time in the small recesses of caves that are inaccessible to humans; (2) entrances to caves are blocked to protect the cave animals from human intrusion; and (3) the Service discourages human visitation to the caves (Service, 2002).

Also, the intended designation will not impact the proposed development along the Maha'ulepu coast, nor will it change the amount of islandwide tourism development. Therefore, this analysis expects no benefit to ecotourism due to implementation of section 7 for the cave animals.

7. PUBLIC COMMENTS

Much of the information provided during the public comment period has been incorporated into the text and tables of the Addendum. However, some reviewers commented that the DEA did not address or did not adequately consider a variety of costs and benefits that they believe could occur due to the implementation of section 7 for the cave animals. Many of these possible costs were, in fact, considered and some were addressed in the DEA. In many cases, however, potential costs were purposely not addressed in the DEA because they are not expected to occur. In other cases, the comments are no longer relevant, given the Service's intended modifications to the proposed critical habitat.

The following responds to specific comments raised during the public comment period that relate to the economic impact of the implementation of section 7 for the cave animals.

1) Development Scenarios

Comment: Elements of the economic analysis are based upon unsubstantiated and speculative development scenarios that greatly exceed foreseeable, sustainable growth for the Koloa/Poʻipu region as set by existing county zoning and State land use designations, as well as other legally-binding planning guidelines such as the *Kauaʻi County General Plan*.

Response: The resort/residential development planned in Units 2 and 4 and the residential development planned in Unit 10 is consistent with the 2000 *Kauaʻi General Plan* (*General Plan*), current State land use districts, and current county zoning. The resort/residential development planned in Units 6 and 8 requires minor modifications in the State land use districts and county zoning, but it is consistent with the *General Plan.* All of this development is likely to occur within the proposed critical habitat between 2003 and 2020 if no consideration is given to the indirect impacts of the intended designation.

The commercial development planned in Unit 10 is not in the General Plan and is not included in the State Urban District. As mentioned in the Indirect Costs section of the Addendum, this development may not occur for reasons unrelated to the intended designation. However, since the General Plan is updated every 10 years or so, the commercial development may be added to the General Plan before 2020. The property values used in the Addendum reflect the fact that the development is not fully entitled, but that the land has development potential.

Barring a hurricane or a major recession that disrupts tourism and resort/residential property sales, it is expected that, without the intended designation, all or nearly all of the planned development in the intended designation would occur by 2020.

2) Costs Relative to Economic Activity

Comment 1: Most development can proceed with reasonable project modifications that will reduce or eliminate damage to the cave ecosystems, therefore the economic impacts are greatly over-stated. The economic analysis indicates that $1.9 billion of development may occur in the region and that project modifications would cost $61.6 million. This represents 3.2% of the cost of development, not an unreasonable amount considering these species and their habitats are highly endangered.

Comment 2: Direct costs of consultation must actually be divided by the profits from the sales, rentals, jobs, etc., produced by all the units of resort, residential, commercial and light industrial development which are likely to be built. Figured per saleable and rental unit and calculated over time, the cost is not likely to be as staggering as portrayed.

Response: The estimates of direct and indirect costs in the DEA were revised based on new information from the Service, resulting in a reduction in these estimates. For the larger projects affected by the intended designation, the revised figures represent a small percentage of the total development costs and profits.

3) Summation of Direct and Indirect Costs

Comment: Direct costs are summed with indirect costs to derive a total impact estimate. Yet, direct costs are associated with development put in place, while indirect costs are associated with development foregone. The benefits of the former should be offset against the costs of the latter, not summed. Also, direct cost estimates do not include multiplier effects of these expenditures, yet indirect costs do include multiplier effects. So we see the full impact of development foregone, but only partial impacts of development actually implemented.

Response: Since the DEA was published, the direct costs and indirect costs have been modified to reflect new information gained since the publication of the DEA and based on the intended critical habitat designation. Direct costs include expenditures on section 7 consultations and project modifications for assumed development. Indirect costs include additional expenditures as well as lost income benefits associated with lost development. The direct and indirect costs are no longer summed; also, the direct costs are not benefits - they do not offset indirect costs.

Indirect costs that reflect the multiplier effects of lost development are no longer included in the analysis because they would be generated in any case: to the extent that development is displaced from the intended designation due to the implementation of section 7 for the cave animals, that development would still be expected to occur but in another location of Koloa outside the critical habitat. This is now expected because of the smaller area intended for designation.

4) Projected Development

Comment: Total impact is based on a guess that between 25 percent (low) and 50 percent (high) of all proposed development will not proceed due to habitat restrictions. [Sec 4.c] Also, Table VI-3 indicates that the "Low Projection" actually assumes a 33 percent loss, not 25 percent as claimed in the text (pg. VI-57). Thus, the "Low" impact should be 25 percent lower than reported, or about $330 million in Net Present Value terms.

Response: Due to the Service's intended modifications to the critical habitat designation, the cost estimates presented have been revised. In particular, the indirect impacts on remaining parcels are considered on a parcel-by-parcel basis whereby the change in the likelihood of development, if any, associated with the intended designation is identified. The costs associated with these impacts are presented in the Indirect Costs section of the Addendum.

5) State Projections

Comment: The State of Hawai'i Department of Business, Economic Development and Tourism (DBEDT) population and tourism growth projections were used for this study. These estimates are higher than the 2000 *Kaua'i General Plan* projections. DBEDT's projections are controversial and contested.

Response: The DBEDT projections are presented in Table II-1 of the DEA, although both the DBEDT and *General Plan* projections are discussed in Chapter II of the DEA. The *General Plan* projections and information from developers are used to determine the amount of development that is planned in the intended critical habitat designation.

While the DBEDT projections are used in comparisons of lost economic activity to projected island-wide economic activity in the DEA, neither the DBEDT projections nor the *General Plan* projections are directly used in the calculation of updated cost estimates presented in the Addendum.

6) Development Outside of Proposed Critical Habitat

Comment: It is erroneous to assume hotel and resort development displaced at Po'ipu is not likely to be replaced by equivalent projects elsewhere on Kaua'i. (V-57). In fact, there is island-wide competition for the resort market, and new areas such as Kapalawai have received Kaua'i's *General Plan* resort designation. Also, visitor accommodations on Kaua'i are diversified with significant uncounted numbers of people staying in vacation rental homes, bed and breakfasts and camping outside of planned visitor destination areas. According to the *Kaua'i General Plan* analysis, the total number of resort and residential units already permitted, as opposed to those desired, is 5,836. (Appendices, Tables C and D). If the density allotted to Kukui'ula is cut in half, that total number is 4,036. Taking the HIGH number of baseline development (2,253, which includes not permitted units desired by Grove Farm), it appears that there must be 1,783 permitted units outside of the proposed critical habitat area. Future growth opportunities in Koloa, not requiring cave species mitigation construction, do exist in both the resort and residential categories. Growth opportunities in the Koloa area are not foreclosed by habitat designation.

Response: As a result of the Service's intended modifications to critical habitat, the DEA's estimates of loss of resort/residential development in the Po'ipu area and reduction in the amount of islandwide development no longer reflect the impacts associated with the intended designation. As discussed in the Indirect Costs section of the Addendum, even if some of the development planned in critical habitat does not take place, it is assumed that other development projects in the Koloa/Po'ipu area will be able to be increased in density or area to satisfy unmet demand for residential or resort/residential development.

7) Public Costs of Development

Comment: The costs of public support of residential and tourism development is not adequately identified or calculated. These costs should be considered avoided costs for reductions in growth. Among the missing estimates for the taxpayers "growth subsidies" are the following: (1) public expenditures for more schools or expansion of existing schools, including teachers, staff and administrators; for police, fire, ambulance, lifeguard personnel and equipment; solid waste; recycling; governmental administrative services; etc. Public subsidies of each unit of residential and of tourism development are substantial; (2) Most of these costs, as well as those for water, sewage and roads (which the study states will not be affected by habitat designation and do require consultations etc.), are increased when development is sprawling rather than contiguous. Development of Maha‘ulepu and the Sugar Mill area would leap beyond current developed areas; (3) Another avoided cost would be the cost to attain permits for projects and project design costs etc. To get permits needed to develop, Grove Farm has previously estimated costs of over $5 million, higher than numbers in the study.

Response: As discussed in the Indirect Costs section of the Addendum, a reduction in islandwide development attributable to the intended designation is no longer anticipated. Similarly, it is assumed there will be no impacts to the Maha‘ulepu development since the areas planned for development are no longer in critical habitat. As such, any avoided public-support costs for reductions in development are not anticipated.

8) Worst-case Scenario Costs

Comment: Table ES-1 appears to present both the low and high ends of the economic impacts estimated, implying that the low-end value reflects the likely least cost that critical habitat designation would impose. In fact, review of the DEA reveals that the "low" value represents the low end of the possible worst-case scenario, not the low end of all likely scenarios.

Response: The impact estimates have been revised in the Addendum to include expected impacts for a number of possible scenarios and the Service's intended modifications to critical habitat. As such, the high and low estimates in Table Add-3 represent the range of reasonably foreseeable direct costs associated with section 7 implementation for the cave animals and the indirect costs associated with the intended designation.

9) Sunk Costs

Comment: The DEA fails to recognize that the costs to investigate the implications of critical habitat are sunk costs associated with the designation process, not additional costs that final designations would impose. Any concerned party investigating the proposed designation of critical habitat on their lands have already hired their lawyers and consultants, and incurred the costs associated with figuring out the implications of designation on their lands. Even were the private landowners' lands ultimately excluded from the final critical habitat designation, the landowners would still not recoup those costs; the money has already been spent. These costs should not be included in the analysis of future potential costs from designation since they have already been incurred and were incurred regardless of the final designation decision.

Response: For completeness, estimated expenditures by landowners to investigate the implications of the proposed critical habitat are included in the DEA and Addendum, even if the funds have already been expended and are not recoverable. In estimating costs, a distinction is made in the Addendum between the designation process and the final designation.

10) Underestimated Costs

Comment: Project modification costs are underestimated, particularly the cascading effect of project realignment with the purpose of avoiding critical habitat. Also, the costs of avoiding subsurface impacts to sewer lines, buried cables, etc., in addition to roads, is underestimated.

Response: The project modification cost estimates take into account a variety of projects, locations, and contingencies, and are based on (1) discussions with the Service and construction contractors, and (2) an examination of the historical record of project modifications regarding the cave animals. The one historical case of a road realignment due to the cave animals involved the Koloa Bypass Road. In this case, the realignment was minor and was completed quickly at relatively low cost. The Service indicates that if a realignment is too costly for a particular project, other alternatives are possible. These include using post-tension concrete to bridge caves and mesocaverns, or placing sewer lines and cables above ground. If none of these options is economically or technically feasible, the Service indicates that a portion of a cave could be sealed off and filled in, as long as precautions are taken to minimize the impact to any cave animals that may be present. The costs associated with these various scenarios are considered in the project modification cost calculations in the Addendum.

In situations where development could be displaced because of critical habitat, the cascading effect of project realignment is taken into account (e.g., a school planned for a location in critical habitat would be relocated to an area planned for residential development, thereby resulting in a loss of planned housing).

11) Underestimated Indirect Costs

Comment 1: The DEA only partially considers the indirect impacts of critical habitat designation, and instead focuses on direct impacts due primarily to consultations under section 7 of the Act. Due to precedent set by *New Mexico Cattle Growers* the Service must fully consider both types of impacts, and the DEA must present a thorough analysis of these economic effects.

Comment 2: The DEA overemphasizes the direct costs attributable to critical habitat designation, which are relatively minor, and ignores or omits many indirect impacts, such as: impacts to housing supply, especially affordable housing required by State and local governments as permit conditions associated with development of market-priced housing, upscale housing, and resort development; impacts to public infrastructure such as schools, parks and roads and decreases in public revenues as a result of reduced economic activity; disproportionate impacts to specific ethnic groups, and other social impacts.

<u>Response</u>*:* Both direct and indirect impacts are analyzed in Chapter VI and in the Addendum, and both are summarized in Table Add-3.

Regarding affordable housing, schools, parks and roads, the developers are obligated to provide them regardless of critical habitat. But if they cannot build them in critical habitat, then they could be moved elsewhere within a project site, displacing market housing or other project components. This displacement was assumed in analyzing the economic impacts of section 7 implementation for the cave animals.

As discussed in the Indirect Costs section of the Addendum and in responses to other comments, a reduction in islandwide development attributable to the intended designation is no longer anticipated. As such, any changes in the public revenues associated with reduced economic activity are expected to be minimal.

No disproportionate economic or social impacts on specific ethnic groups were identified.

12) Redistricting

<u>Comment</u>*:* The DEA acknowledges that some or all lands designated as critical habitat may be redistricted/rezoned at the State or county level to preclude further development, the actual economic costs of redistricting could be very high ($1.54 billion to $3.1 billion). These estimates are mentioned in the text but not in the summaries of the economic impacts.

<u>Response</u>*:* Due to the Service intended modifications to critical habitat, economic impacts on the order of $1.54 billion to $3.1 billion are no longer anticipated. The Indirect Costs section of the Addendum considers the potential indirect impact of the intended designation on each parcel in the intended designation to determine an estimate of development impacts (including any associated with potential redistricting, as applicable).

13) Past Investments and Related Returns

<u>Comment</u>*:* The DEA does not account for investments and other expenditures already made on lands with the expectation that rezoning and redistricting will allow future development and hence a return on investment, nor does it account for the potential lost recapture of investment yields that may be foregone due to lost development potential for lands that have successfully been rezoned and permitted for development at a very high cost.

<u>Response</u>*:* The Indirect Costs section of the Addendum presents an estimate of the loss in property values associated with the indirect effects of the intended designation. The property values used in the analysis reflect past investment to develop project plans and obtain entitlements, and the related future time-stream of economic and other benefits that would flow from the project.

14) State HCP

<u>Comment</u>*:* The DEA fails to consider the more restrictive Habitat Conservation Plan (HCP) guidelines under the Hawaii Endangered Species Law (HRS 195D , HRS 195D 1) which required

that the State HCP permittee show a net benefit to the species. The DEA fails to analyze impacts due to the circumstance in which a landowner qualifies for a Federal HCP but is unable to obtain a State HCP.

Response: None of the landowners and developers remaining in the intended designation are anticipated to seek an HCP as a result of critical habitat designation. Section 4 of the Addendum discusses the indirect impacts of the intended designation in greater detail.

15) Unmapped Holes

Comment: The narrative exclusion of areas underlying currently developed areas such as buildings and driveways ("unmapped holes" is too vague considering the cryptic nature of the organisms and their habitats). The DEA fails to fully consider the economic impacts of landowners costs to properly demarcate unmapped holes in the process of obtaining necessary permits for development projects.

Response: The intended critical habitat designation contains few unmapped holes or developed areas. The costs to landowners to demarcate these sites is expected to be minimal.

16) Mining

Comment 1: The DEA does not take into account the loss of income by Jas W. Glover Ltd., the operators of the quarry. The DEA should use a figure of $31-35/ton for shipping of limestone to Kaua'i , not the $13 to $16 per ton due to costs of wharfage fees loading and unloading costs, trucking, insurance and other costs. In addition, the loss of quarry materials will have impacts throughout the construction industry on Kaua'i.

Comment 2: However, another commenter stated the siting of an additional quarry in the area is no longer necessary because market conditions have changed and products produced by the expanded quarry are not needed by the local economy.

Comment 3: The operator of the quarry on Grove Farm lands (Jas W. Glover Ltd.) is a small entity; furthermore, it is woman-owned and Native Hawaiian-owned. Because this firm is one of only two aggregate producers on the island, the impacts to this economic sector should be considered under impacts to Small Entities.

Response: The site planned for the future expansion of the limestone quarry is no longer included in the intended critical habitat designation, so the associated direct costs, indirect costs, and impacts to small entities attributable to the intended designation are zero.

17) Small Entities

Comment: The DEA incorrectly lists Kobayashi Group LLC as the owner of Kiahuna Golf Course and surrounding lands. The golf course (225.063 acres) is owned by Kiahuna Golf Club, LLC; the adjacent lands (95.412 acres) are owned by KG Kaua'i Development, LLC. These are distinct entities and not subsidiaries of Kobayashi Group LLC, although there are common elements of ownership between various individuals. Kiahuna Golf Club, LLC and KG Kaua'i Development, LLC believe they qualify as small businesses. Because the DEA indicates that there will be substantial adverse impacts on small landowners such as KG Kaua'i Development, LLC and Kiahuna Golf Club, LLC there should be a Regulatory Flexibility Analysis performed on the designation of critical habitat.

Response: The Addendum lists KG Kaua'i Development, LLC (KGKD) as the owner of the land that is planned for the Kiahuna Golf Village Expansion and the Kiahuna Golf Course Expansion. No impacts are anticipated for the continued operation of the existing Kiahuna Golf Course by Kiahuna Golf Club, LLC.

RFA/SBREFA regulations state that the Small Business Administration (SBA) counts the receipts or employees of the business whose size is at issue and those of all its affiliates in determining the business size. Businesses are affiliates of each other when one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another business, and contractual relationships, in determining whether affiliation exists. Finally, RFA/SBREFA regulations state that a firm will not be treated as a separate business concern if a substantial portion of its assets and/or liabilities are the same as those of a predecessor entity. In such a case, the annual receipts and employees of the predecessor will be taken into account in determining size (13 CFR 121).

KGKD states that is it affiliated with Kobayashi Group LLC through common ownership by certain individuals. In addition, KGKD was recently established by the Kobayashi Group LLC for the purpose of acquiring the properties surrounding the golf course. As such, Kobayashi may be considered a predecessor entity of KGKD. Due to its affiliation with Kobayashi Group LLC, KGKD is not considered separately in the RFA/SBREFA analysis in the Addendum.

18) Benefits

Comment 1: The level of effort to document and analyze the potential economic impacts resulting from critical habitat designation greatly exceeded the level of effort to document and analyze of potential economic benefits due to designation, resulting in an unbalanced overestimation of detrimental economic impacts, and an unfair underestimation of economic benefits due to designation of critical habitat.

Comment 2: The benefits of species protection are overstated and speculative. The DEA does not present the expected circumstances or timeline for delisting the species, nor is there an quantifiable estimate of the economic benefits of delisting. In addition, one commenter states the species themselves have no economic value; any estimate of economic benefit derived from not fully developing lands proposed for critical habitat are speculative and unquantifiable.

Response: Even though the material presented in the DEA and in the Addendum regarding benefits is not as extensive as the material on costs, this does not result in overestimated costs and underestimated benefits. The less extensive analysis of the benefits is due to (1) a lack of scientific studies on environmental and biological changes that would be attributable to section 7 implementation for the cave animals, and (2) the lack of existing economic studies on the economic value of these changes. However, the Addendum presents an expanded discussion of benefits, including the estimated value of retaining land in open space due to critical habitat.

The expected circumstances and the potential timeline of delisting the cave animals will be presented in the Service's final recovery plan for the cave animals. The DEA does discuss the reduced costs due to successful preservation and the existence value of the cave animals in the Benefits section of Chapter VI; however, these benefits are not quantified given the lack of information as described above.

19) Economic Benefits

Comment: Based on 6,000 acres of undeveloped land bounded by Ha‘upu ridge, and using pro rata estimates of ecological values from a University of Hawai‘i study of the value of the Ko‘olau Range on O‘ahu[3], the Koloa/Po‘ipu viewscape is worth $29 million per year (at $0.23 per acre per household for Kaua‘i's 21,000 households). Over 18 years (comparable to Service estimates), this sums to $521 million. The annual stream of benefits from the conservation district is $10.1 million annually (at $1,690 per acre), summing to another $182.5 million on a comparable basis. The net present value of the undeveloped land is $456.9 million (at the UH lower estimate of $76,146 per acre). Degradation scenarios combining urban creep, invasive species and human/animal disruption resulting in recharge loss could cost another $3.6 million annually (at $600 per acre), or a total of $65 million. That is only a start at estimating the ecological benefits and savings associated with preserving this undeveloped land, and we are at $1.225 billion already.

Response: The suggested benefits analysis would yield inaccurate results for several reasons. First, the proposed critical habitat for the cave animals as described in the proposed rule covers 4,193 acres. Since the publication of the proposed rule, the Service has identified several areas of the proposed critical habitat that it intends to remove for biological reasons, which would reduce the critical habitat to 272 acres. Basing the benefits analysis on 6,000 acres would overstate the economic benefits attributable to the implementation of section 7 for the cave animals.

Second, the commenter uses an incorrect value of open space. As stated in the University of Hawai‘i study, a recent survey found that O‘ahu residents are willing to pay $0.0023 per acre (0.23 cent per acre) for the preservation of open agricultural land on O‘ahu. The commenter's use of $0.23 (23 cents) per acre overstates the benefits associated with open space by a factor of 100. The Benefits section of the Addendum uses the 0.23 cent per acre figure, corrected for (1) inflation; (2) the income levels on Kaua‘i; and (3) the amount of existing open space on Kaua‘i compared to

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[3] http://www2.hawaii.edu/~uhero/workingpaper/HawaiiEnviroEvaluation.pdf: Environmental Valuation and the Hawaiian Economy, by Brooks Kaiser, Nancy Krause, and Jim Roumasset.

O'ahu. To calculate the value of additional open space, the corrected figure is then applied to the amount of land that may no longer be developed due to critical habitat.

Third, the University of Hawai'i (UH) study on the Ko'olau Range on O'ahu focuses on the economic benefits provided by a mountainous region covered by dense forests and many native Hawaiian plants. The proposed critical habitat is in a gradually sloping and relatively dry area that contains many non-native plant species. Since the ecosystems of these two areas are vastly different, the ecosystem services provided by these areas will also be different. As such, the economic valuation of the ecosystem services provided by the Ko'olau Mountains is generally not transferrable to the proposed or intended critical habitat. For example, the value of water recharge in the UH study reflects projected water supply and demand conditions on O'ahu, an island which is 9 percent larger than Kaua'i but has a population of more than twelve times that of Kaua'i. Furthermore, neither the proposed nor the intended critical habitat is not in an area of high rainfall. Also, the UH benefit analysis of reducing soil runoff is unique to three valleys that drain through partially channelized streams in urban areas into the man-made Ala Wai Canal. Since this canal was designed with inadequate flushing from stream or ocean currents, it functions as an unintended settling basin so must be dredged periodically. The proposed and intended designations drain into a portion of the ocean that has strong currents and adequate flushing. And unlike the Ko'olaus, none of the proposed or intended critical habitat contains streams and aquatic life, and none of the units is suitable for hunting wild pigs.

Finally, the commenter's summation of benefits to $1.225 billion is flawed due to double-counting. For example, the $1,690 per acre figure in the UH study includes the benefits of open space. So adding the estimated open space benefit of $521 million to the ecosystem services estimate of $182.5 million double-counts the benefits of open space. Similarly, the two per-acre figures taken from the UH study ($1,690 per acre and $76,146 per acre) are two different measures of the same ecosystem benefits. The first figure refers to the annual stream of benefits, while the second figure refers to the net present value. Multiplying both of these figures by 6,000 acres and adding them together clearly double-counts the ecosystem benefits.

20) Ecosystem Functions

Comment: Assigning an economic value to preservation of ecosystem functions that may result from the designation of critical habitat (such as groundwater recharge, protection of coastal marine waters and fisheries, and other ecosystem services) is now an acceptable method of economic analysis. The dollar value of these services is high, however, this analysis was done in a qualitative, narrative manner in the draft economic analysis, why was it not done in a quantitatively?

Response: Quantitative estimates of the economic benefits of the listed ecosystem services provided by critical habitat are not presented in the DEA or in the Addendum because studies estimating the change in the ecosystem associated with critical habitat designation and the value of that change are not available.

However, such benefits are likely to be small. For example, the proposed critical habitat is near the coast in an area of low rainfall, and thus contributes little to groundwater recharge.

The reduction of development and grazing in critical habitat could reduce soil runoff thereby protecting the coastal marine waters and fisheries off the south shore of Kaua'i. However, as mentioned in the DEA, this benefit is likely to be small because the affected marine ecosystem has already been altered by over 150 years of sugarcane cultivation in the area. Also, Koloa has an open coastline that is exposed to surf and strong ocean currents that continually flush the near-shore environment. Finally, any displaced development is likely to occur elsewhere in Koloa. Thus, the net environmental benefit to Kaua'i is likely to be small.

Additional environmental benefits, such as the preservation of open space, changes to traffic congestion, and the promotion of native plants, are discussed in the Benefits section of Chapter VI in the DEA and in the Addendum.

21) Open Space

Comment: There was no attempt to quantify the value of open space (parks, preserves, even golf courses) surrounding real estate. Such increased property values are acknowledged but there was no attempt to estimate the corresponding increases in property values. Understanding of this principle is a large driver in the DMB Development Company's decision to halve the density of their joint project with A&B at Kukui'ula.

Response: The Indirect Costs section of the Addendum discusses the possibility that the land planned for development in certain critical habitat units will remain open as a result of the intended designation. If this land is landscaped and managed as a park or preserve, it could increase the selling values of the home lots that are directly adjacent to critical habitat. An estimate of the number of homes or lots adjacent to the intended critical habitat units, as well as the potential increase in selling values, is discussed for critical habitat Units 6 and 8.

22) Benefits of Less Development

Comment: Development in the Koloa/Po'ipu area is already progressing at unsustainable levels; future traffic, emergency services, and possibly water supply are sources of uncertainty. It is good that the critical habitat designation places additional mechanisms to undertake reasonable slow-growth planning for the region. Also, some tourists prefer less developed areas. The potential loss of revenues due to people seeking less overbuilt resort area would be conjectural, but no more so than the assumption that critical habitat designation for cave species will reduce the number of visitors to Kaua'i.

Response: With the intended reduction in critical habitat, it is now assumed that any loss in development due to the intended designation will be replaced by development elsewhere in Koloa (see the Indirect Costs section of the Addendum). Thus, critical habitat designation for the cave animals, as intended by the Service, is expected to result in little or no change to future traffic, emergency services, water requirements, etc.

23) Planned Development

Comment: Portions of Unit 2 and the eastern portion of Unit 1 are planned but not permitted for major resort development; the southern portion of Unit 1 is planned but not permitted for subdivision into over 50 upscale houselots; a portion of Unit 3 is planned and permitted for a future limestone and basalt quarry; the area surrounding the old Koloa sugar mill will be expanded into an industrial area; several water wells are located in Unit 1 and additional water wells are expected. This development will create residential and employment opportunities for over a thousand island residents. Another commenter stated the Eric A. Knudsen Trust is seeking to subdivide or otherwise participate in the development of at least 741 lots/resorts units on 202 acres of trust-controlled lands [TMKs: (4) 2-8-015:082, (4) 2-8- 013:01; (4) 2-8-014:01, 02, 03, 04, 19, 30 {in part}; (4) 2-8-09:09, (4) 2-8-011:01, 18, 20, 35].

Response: Most of the development projects and associated water well projects mentioned by the commenter are no longer in the intended critical habitat designation. The potential impacts to an Eric A. Knudsen Trust resort/residential development project is discussed in the Indirect Costs section of the Addendum.

8. SUMMARY OF ECONOMIC IMPACTS

Table ES-1 of the DEA, which is duplicated as Table VI-5 in Chapter VI of the DEA, presented the costs and benefits attributable to section 7 implementation for the cave animals. Table Add-3 in this Addendum presents revised costs and benefits based on the following: (1) the intended critical habitat designation, (2) issues raised in public comments on the DEA, and (3) new information obtained since the DEA was published. Table Add-3 also compares the DEA costs with the revised costs, and provides explanations as appropriate. As illustrated in this table, the Service's intention to reduce for biological reasons the area of the critical habitat from 4,193 acres to 272 acres will greatly reduce (1) direct section 7 costs, (2) indirect costs, and (3) benefits.

In the proposed critical habitat, direct section 7 costs were expected to range from $56.5 million to $62.3 million. For the intended critical habitat, this analysis expects the direct section 7 costs to range from $260,000 to $429,000. Table Add-3 also compares the average annual direct costs.

Regarding indirect costs, this analysis anticipates no islandwide impacts on economic and population growth. For affected properties, however, the intended designation may cause a net reduction in property values on the order of $4.5 million to $6.1 million over 18 years. Additional indirect costs are associated with the following: contesting redistricting, additional State and county environmental review, and investigating the implications of the final designation. The other indirect costs identified in the DEA are no longer anticipated for the intended designation because the affected areas will be removed. The total indirect costs range from $4.6 to $6.4, for an annualized estimate of $450,000 to $621,000 per year for 18 years.

Some of the benefits of implementation of section 7 for the cave animals mentioned in the DEA remain unchanged. However, other benefits are no longer expected or will be reduced, including: benefits associated with preserving certain areas of open space along the Maha‘ulepu coast and elsewhere, reduced soil and chemical runoff, traffic congestion, and ecotourism.

Table Add-3. Section 7 Costs and Benefits Attributable to the Cave Animals Listing and Critical Habitat

(18-year estimates)

CH = critical habitat PMs = project modifications O&M = operations and maintenance Fed = Federal ne = not estimated

Item	DEA Low	DEA High	Addendum Low	Addendum High	Explanation
DIRECT SECTION 7 COSTS					
Conservation Programs					
Service Conservation Programs, Consultations	$15,600	$15,600	$23,500	$34,900	Identification of specific areas may lead to conservation projects
Service Conservation Programs, PMs	None	None	None	None	
NRCS Conservation Programs, Consultations	$92,000	$161,000	$7,600	$19,000	Identification of specific areas may lead to conservation projects
NRCS Conservation Programs, PMs	None	None	None	None	
Farming and Ranching Operations					
Farm Loan Programs, Consultations	$23,000	$34,500	None	None	No farming and minimal ranching in intended designation
Farm Loan Programs, PMs	Minor	Minor	None	None	
Mining and Quarrying Operations					
Consultations	$22,000	$22,000	None	None	Area to be removed for biological reasons
PMs (Does not include ripple effects)	$8,700,000	$10,800,000	None	None	
Navigational Aids	None	None	None	None	Area to be removed for biological reasons
Places of Worship and Cemeteries					
Existing Religious Establishments and Cemeteries	None	None	None	None	Area to be removed for biological reasons
New Religious Buildings	None	None	None	None	
Power Lines	None	None	None	None	Area to be removed for biological reasons
Water Systems					
Existing Irrigation Systems	None	None	None	None	Area to be removed for biological reasons
New Irrigation Improvements	None	None	None	None	
Existing Potable Water Systems	None	None	None	None	Area to be removed for biological reasons
New Potable Water Improvements	None	None	None	None	
Roads					
Existing Roads	None	None	None	None	No change
Construction of New Roads, Consultation	$79,400	$79,400	$19,400	$19,400	All road projects except Koloa Bypass widening to be removed for biological reasons
Construction of New Roads, PMs	$3,950,000	$6,400,000	$170,000	$285,000	
Development					
Resort/Residential Development, Consultations	$26,100	$39,300	None	None	Area to be removed for biological reasons
Resort/Residential Development, PMs	$42,900,000	$43,200,000	None	None	
Golf Courses and Parks					
Existing Golf Courses and Parks	None	None	None	None	No change
Planned Golf Courses and Parks, Consultations	$22,000	$22,000	$15,700	$15,700	Survey no longer necessary
Planned Golf Courses and Parks, PMs	$217,800	$594,000	$24,200	$54,600	Portion of planned golf course to be removed for biological reasons

Table Add-3. Section 7 Costs and Benefits Attributable to the Cave Animals Listing and Critical Habitat

(18-year estimates)

(continued)

CH = critical habitat PMs = project modifications O&M = operations and maintenance Fed = Federal ne = not estimated

Item	DEA Low	DEA High	Addendum Low	Addendum High	Explanation
Development, continued					
Residential Development					
Existing Residential Homes, Consultations	$43,200	$50,400	None	None	Area to be removed for biological reasons
Existing Residential Homes, PMs	$4,900	$11,900	None	None	
Planned Residential Development, Consultations	$22,000	$22,000	None	None	Area to be removed for biological reasons
Planned Residential Development, PMs	$143,200	$326,700	None	None	
Commercial Development	None	None	None	None	Area to be removed for biological reasons
Industrial Development					
Consultations	$22,000	$22,000	None	None	Area to be removed for biological reasons
PMs	$21,400	$55,400	None	None	
Wastewater Treatment					
Consultations	$22,000	$44,000	None	None	Area to be removed for biological reasons
PMs	$27,400	$99,000	None	None	
Injection Wells					
Consultations	$21,600	$36,000	None	None	Area to be removed for biological reasons
PMs	$60,000	$125,000	None	None	
Underground Storage Tanks	None	None	None	None	No change
Ecotourism	None	None	None	None	No change
Natural Disasters					
Fed. Emergency Management Agency, Consultations	$7,500	$15,000	None	None	Area to be removed for biological reasons
Federal Emergency Management Agency, PMs	Minor	Minor	None	None	
Farm Service Agency Disaster Assistance, Consultations	$7,500	$15,000	None	None	Area to be removed for biological reasons
Farm Service Agency Disaster Assistance, PMs	Minor	Minor	None	None	
Service Incidental Take Permits					
Consultations	$62,400	$62,400	None	None	Area to be removed for biological reasons
PMs	None	None	None	None	
TOTAL COSTS					
Direct	$56,513,000	$62,252,600	$260,400	$428,600	
Discounted Present Value**	$31,581,621	$34,789,129	$145,521	$239,518	
Annualized**	$3,139,611	$3,458,478	$14,467	$23,811	

** Present value and annualized calculations are based on the OMB prescribed seven percent discount rate and the assumption that total costs are distributed evenly over the entire period of analysis.

Table Add-3. Section 7 Costs and Benefits Attributable to the Cave Animals Listing and Critical Habitat
(18-year estimates)
(continued)

CH = critical habitat PMs = project modifications O&M = operations and maintenance Fed = Federal ne = not estimated

Item	DEA		Addendum		Explanation
	Low	High	Low	High	
INDIRECT COSTS*					
Impacts on Development	n/a	n/a	$4,500,000	$6,100,000	High estimate loss in property values associated with loss in development potential. Actual loss is an undetermined percentage of this amount.
Property Tax Changes	(Included in "Islandwide Loss in Income Benefits" below)		None	None	Loss in county property tax revenue due to changes in property taxes
Habitat Conservation Plans	$3,900,000	$7,300,000	None	None	No longer anticipated
Islandwide Impacts					
Expenditures and Sales: 2020					
Construction Related	$4,666,000	$12,900,000	None	None	Islandwide impacts no longer anticipated in intended designation
Hotel, Resort/Residential, and Related Activities	$93,317,000	$258,004,000	None	None	
Total	$97,983,000	$270,904,000	None	None	
Employment: 2020					
Construction Related	263	763	None	None	
Hotel, Resort/Residential, and Related Activities	1,069	2,957	None	None	
Total	1,332	3,720	None	None	
Total Loss in Income Benefits: 2003 to 2020	$546,659,000	$1,539,107,000	None	None	
Costs and Delays for Successful Projects					
Environmental Reviews	$108,000	$440,000	None	None	No longer anticipated because landonwers and developers will likely avoid developing in the intended designation
Litigation	Large	Large	None	None	
Other Residential, Commercial and Industrial Development	Moderate	Moderate	None	None	Area to be removed for biological reasons
Agriculture	Moderate	Moderate	None	None	No change in islandwide population or economic activity anticipated
Underground Storage Tanks	None	None	None	None	No change
Contesting Redistricting	$1,000,000	$1,000,000	$0	$50,000	Fewer landowners in intended designation affected by potential redistricting
Land Management for Conservation	Large	Large	None	None	Conservation management no longer reasonably forseeable
State and County Environmental Review	$375,000	$975,000	$50,000	$150,000	Fewer projects in intended designation
Reduced Property Values	$36,000,000	$72,000,000	(Included in "Impacts on Development" above)		Loss in property values associated with loss in development potential
Condemnation of Property	None	None	None	None	No change
Investigating Implications of CH	$225,000	$526,000	$19,000	$55,000	Fewer landowners in intended designation
Loss of Conservation Projects	None	None	None	None	No change
TOTAL COSTS					
Direct	n/a	n/a	$4,569,000	$6,355,000	
Discounted Present Value**	n/a	n/a	$4,538,560	$6,242,504	"Impacts on Development" are already expressed in discounted present value
Annualized**	n/a	n/a	$451,190	$620,584	

** Present value and annualized calculations are based on the OMB prescribed seven percent discount rate and the assumption that total costs are distributed evenly over the entire period of analysis.

Table Add-3. Section 7 Costs and Benefits Attributable to the Cave Animals Listing and Critical Habitat

(18-year estimates)

(continued)

CH = critical habitat PMs = project modifications O&M = operations and maintenance Fed = Federal ne = not estimated

Item	DEA		Addendum		Explanation
	Low	High	Low	High	
BENEFITS					
Benefits of Species Preservation	Significant	Significant	Significant	Significant	No change
Reduced Costs Due to Successful Preservation	Large	Large	Large	Large	No change
Environmental Benefits and Other Benefits					
Open Space, Maha'ulepu Coast	Significant	Significant	None	None	Area to be removed for biological reasons
Other Open Space	Significant	Significant	<$18,700	<$18,700	Value based on O'ahu survey
Soil and Chemical Runoff	Small	Small	Small	Small	Most development and all farming to be removed for biological reasons
Traffic Congestion	Large	Large	None	None	No change in islandwide population or economic activity anticipated
Native Plants	Significant	Significant	Significant	Significant	No change
Ecotourism	Small	Small	None	None	Proposed development along Maha'ulepu coast to be removed for biological reasons and no change in islandwide population or economic activity anticipated
Economic Activity Generated by Conservation Management	Possibly Large	Possibly Large	None	None	Conservation management no longer reasonably forseeable
Benefits to Developers	Minor	Minor	Minor	Minor	No change

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Information was provided in communications with representatives of:

- Alexander & Baldwin, Inc
- Eric A. Knudsen Trust
- Gillin Beach House
- Grove Farm Co., Inc.
- KG Kaua'i Development, LLC
- U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office

[4] Certain references listed in the references section of the DEA were also used in the preparation of this Addendum.